This volume is bound INCOMPLETE per instructions of Librarian.
Attach Index or missing parts to this stub.

THE REFINER AND NATURAL GASOLINE MANUFACTURER

In This Issue

Mexican Crude has probably offered the greatest problem yet encountered in petroleum refining. Some of its characteristics and how it has been successfully handled.

What's happening among Refiners and Gasoline Manufacturers can be found in the plant construction activity section.

Regular features on new patents granted for refinery and gasoline plant equipment, personals among the the industry and market quotations on supplies. Complete index to technical articles appearing in previous issues of The Refiner and Natural Gasoline Manufacturer.

3 No. 1 JANUARY, 1924 $1.00 Per Year

R 665.5 1924 V.3

SERIAL

Better Paint for Your Tank Cars

The list of refiners and natural gasoline manufacturers using Metalsteel Aluminum Paint on tank cars and other equipment is steadily growing. Why? Because Metalsteel Aluminum (made and sold only by the St. Louis Surfacer & Paint Co.) has proved itself to have two very desirable qualities:—

1st—It is one of the greatest practical heat deflectors known—therefore it cuts down evaporation losses.

2nd—It is one of the best metal protective coatings that has yet been developed.

These two qualities are particularly assured because Metalsteel Aluminum is made on a linseed oil base and contains no old-time dope solution or cut varnish base.

Order enough for a good trial. One gallon covers 600 square feet one coat. Price $3.00 per gallon f. o. b. St. Louis.

ST. LOUIS SURFACER & PAINT CO., 5506 Hazel Ave., St. Louis, Mo.

Photograph Through Courtesy The Akin Gasoline Co., Tulsa, Okla.

METALSTEEL
Aluminum Paint

When Powell Broke Loose—

Humble needed tanks, and needed them badly. They called on P. I. W. with the result shown above. In less than four days from receipt of the first order a solid trainload of 10 COMPLETE 55's was en route to Corsicana, making record time. Following the first train came a second and third, all in less than two weeks.

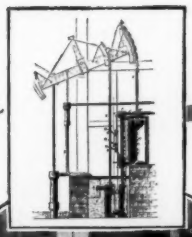
The Humble farm at Corsicana is shown below. In the foreground is a veteran P. I. W. field crew. The progress of the work can be seen. Ready for oil in less than three weeks!

That's P. I. W. Service

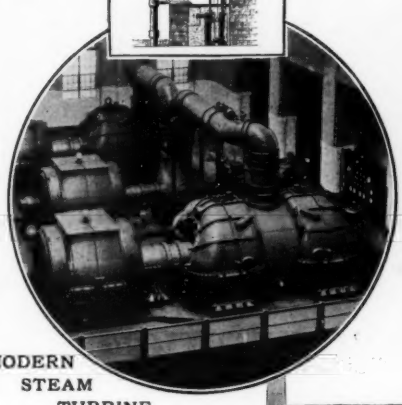
THE PETROLEUM IRON WORKS COMPANY

New York St. Louis Tulsa Houston Casper San Francisco

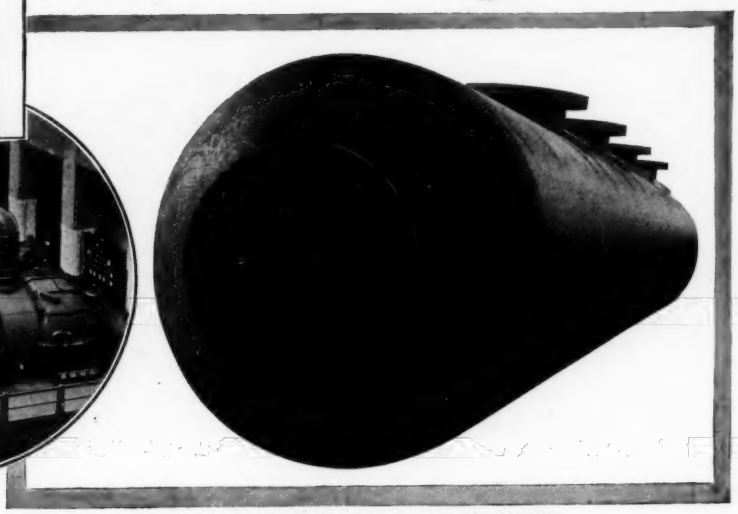
Pressure of Economic Forces



WATT'S ORIGINAL STEAM ENGINE 1774



MODERN STEAM TURBINE



THE MOST MODERN DEVELOPMENT OF STEEL PLATE CONSTRUCTION— A SEAMLESS, BOTTLE-TIGHT HAMMER-WELDED STILL

Pressure of Economic forces demanded the development of the modern steam turbine from the crude machine of James Watt.

The same forces demanded the development of the Blaw Knox Hammer Welding Process for the manufacture of tanks, oil cracking stills, autoclaves, etc.

Seamless—One Piece—Bottle Tight

BLAW-KNOX PRODUCTS
STEEL FORMS For Concrete Construction
ROAD BUILDING EQUIPMENT
GLAMSHELL BUCKETS
STEEL BUILDING (Sectional)
TRANSMISSION TOWERS
STRUCTURAL STEEL
PLATE WORK
WATER-COOLED APPLIANCES For High Temperature Furnaces
SHEET and TIN and STRIP and WIRE MILL EQUIPMENT
FORGE and HAMMER WELDING

BLAW-KNOX COMPANY

666 Farmer's Bank Bldg. Pittsburgh, Pa.

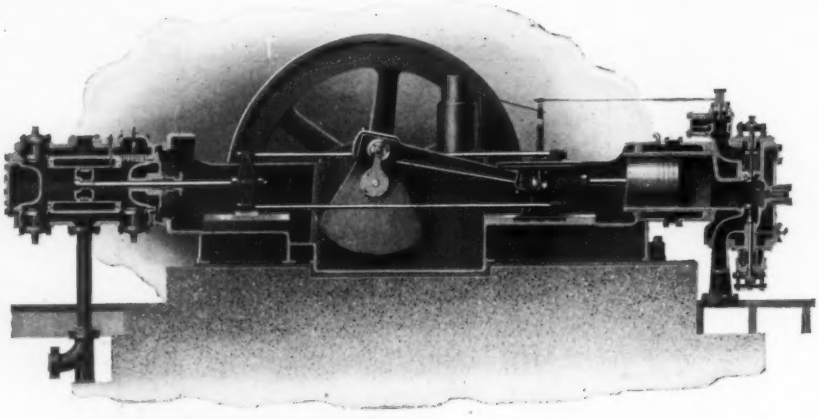
New York, 30 E. 42nd Street
Baltimore, Bayard & Warner Sts.
Birmingham, American Trust Bldg.
Chicago, People's Gas Bldg.
Detroit, Lincoln Bldg.
Buffalo, Genesee Bldg.
London, Eng., Caxton House

TRADE MARK REG. U.S. PAT. OFF. BLAW-KNOX

FORGE AND HAMMER WELDING

Tell them where you saw the ad

XUM



"HEARD AT THE TULSA CONVENTION"

"This is the engine Arab is installing."

"Is it the same engine Barnsdall Oil uses?"

"Sure thing," came the reply, "and a Lone Star man just told me they have seventy-eight Coopers—put in twenty-six this year."

Apparently they were two Osage country gas engine operators enjoying a few days at the Tulsa convention.

"Here, Slim, look at this crosshead. Say, if we had engines like this we wouldn't have to shut down once a week to make adjustments."

"Yes, and just show me a nut on it that you can't get at with a good old open-end wrench without even crooking your neck," responded the partner.

We, who were listening, would like to have explained that such combined strength and accessibility is the result of ninety years' experience in designing and building machinery—machinery which both the engineers and company officials have always preferred.

Cooper Gas Engines and Compressors are built in standard sizes from 80 to 1300 B. H. P. for every power purpose.

The C&G COOPER CO.

MT. VERNON, OHIO

504 Kennedy Bldg., Tulsa Okla.
1605 Kirby Bldg., Dallas, Texas

OFFICES AT
1507 First National Bank Bldg., Pittsburgh
453 First National Bank Bldg., Chicago
225 Atco Bldg., Tulsa
426 Douglas Bldg., Los Angeles
212 W. T. Waggoner Bldg., Fort Worth

The REFINER and NATURAL GASOLINE MANUFACTURER
Published Monthly by GULF PUBLISHING Co.
Houston, Texas

For men engaged in the operating branch of the refining and natural gasoline business.

Vol. 3 January No. 1

R. L. DUDLEY..Manager and Editor

Price .....$1 per year

Advertising rates upon application to nearest office.
Copyrighted by the Gulf Publishing Co., 1924

"Entered as second-class matter January 16th, 1923, at the Postoffice at Houston, Texas, under the Act of March 3, 1879."

Getting the Most Out of Mexican Crude

Methods used to obtain high yield from heavy oil and the results accomplished

By F. N. Williams, A. M. Inst. P. T.

THIS article will describe the crude, methods of refining, apparatus used, yields, products obtained, description of products and general discussion of the use of pressure stills to increase the yield of gasoline from Mexican crude.

Mexican crude may be described as a high class paraffin base crude containing a large percentage of asphalt and considerable sulphur, or, as asphalt base crude containing paraffin in sufficient quantity to make it quite hard for the refiner to follow with full success, either method of refining i. e. considering it as either an asphalt or paraffin base crude, and to obtain the full yield of each class of products.

As an asphalt producer Mexican crude stands in a class by itself, practically any asphalt, road oil, etc., specification may be met by products from this crude. The lubricating oils and wax are of good quality when properly refined and it is possible to make large quantities of red and pale lubricating oils and also steam cylinder stocks, which will be mentioned later.

The two most prolific pools in Mexico yield crude of from 19.0 to 21.0 Be. gravity and 10.0 to 13.0 Be. gravity oils.

ANALYSIS OF SOME MEXICAN CRUDES

District	Specific Gravity 60/60	Baume Gravity	Sulphur	Paraffin
Tuxpam	.9895	11.5	4.25	0.4
Ebano	.9831	12.4	...	...
Hy. crude	.9824	12.5	4.17	...
Hy. crude	.9804	12.8	3.6	0.5
Hy. crude	.9797	12.9	4.9	...
Tuxpam	.9783	13.1	...	...
Lt. crude	.9384	19.2	3.20	...
Lt. crude	.9315	20.3	2.60	1.62
Lt. crude	.9303	20.5	3.06	...
Chinampa	.9303	20.5	3.30	...
Tepetate	.9390	20.7	3.40	1.70
Tanhuijo	.9150	23.0	1.69	...
Alamo	.9125	23.3	2.70	...
Furbero	.8947	26.4	2.46	...
Chiapas	.8827	28.6	...	...
Tecuanapa	.8563	33.5	1.00	...
Guerrero	.8563	33.5	...	...
Tecuanapa	.8511	34.5	.90	...
Sarlat	.8304	38.6	...	...
San Pedro	.7847	48.4	...	...
Mantanzas	.8078	43.3	...	...
Topila	.7838	48.6	...	...

Tepetate Crude Products
(20.4 Baume Gravity)

Gasoline 16.0% — Grav. 58.0 Be. Sulp. .089% Dr. Neg

NAPHTHA 20.0%
Naphtha bottoms 4.0% — Flash 149 F. Grav. 42.4 Be.

GAS OIL 15.83%
Gravity 34.9 Be. Flash 210 F. Sulp. 1.639% B. T. U. 19,500

PALE NEUTRAL OIL 5.11%
Visc. 61 @ 100 F Sayb. Pour. 50 F.

RED OIL 33.00%
Grav. 21.1 Be. Flash. 330 F. Fire. 420 F. Visc. 248 @ 100 F. Sayb. Pour. 60 F.

Treating Loss 4.7%
Coke, Gas and Loss 21.36%

100.00%

Mexican Crude Distillation[1]
(20.3 Baume Gravity)

DRY DISTILLATION

		Specific Gravity	Baume Gravity
Gasoline	16.1%	.7629	53.5
Gas oil	49.6%	.8388	36.7
Lubricating oil	10.1%	.8991	25.7
Wax	1.3%[2]		
Residue	29.4%[2]		
Loss	3.1%[2]		

STEAM DISTILLATION

Gasoline	14.8%	.7594	54.4
Gas oil	39.8%	.8334	38.0
Lubricating oil	24.3%	.9050	24.7
Wax	1.8%		
Residue	18.9%		
Loss	6.5%		

[1]In the dry distillation steam was used until the gasoline was off, then the distillation was carried on dry. In the steam distillation, steam was used throughout. The gas oil was distilled off at between 375 F. and 600 F. still temperature. The wax and lubricating oils were separated by chilling and filtration.

[2]Percentage by weight, all other percentages by volume.

TUXPAM CRUDE DISTILLATION
(21.5-22.0 Baume Gravity)

First Distillate 25.0%: Gasoline....12%; Naphtha.... 5%; Kerosene... 8%

Wax distillate 28.0%: Heavy Lube ..10.0%; Light Lube ...5.0%; Wax ..... 1.5%; Gas oil .....10.0%; Loss 1.5%

Wax distillate 38.0% — Light Wax distillate: Gasoline .... 2.0%; Gas oil 5.0%

Coke 2.0%
Gas (air) 1.0%
Asphalt 35.0%
Loss 2.0%

NET YIELD

	Per-cent
Gasoline (60.0 gravity)	14
Naphtha	5
Kerosene	8
Heavy lube	10
Light lube	5
Wax	1.5
Gas oil	15
Coke	2.0
Gas (air)	1.0
Asphalt	35
Loss	3.5
	100.00

Pipe Stills

As Mexican crude invariably contains more or less water, it should be primarily distilled in pipe stills, where the water content is taken care of continuously and is distilled off with the naphtha.

It is a waste of time and fuel to attempt to dry the crude in cylindrical stills by the batch method. The writer has known of cases where it required from 30 to 70 hours to drive the water from this crude in batch stills, when the temperature was increased slowly to about 210 to 230 F. and the oil agitated with air, holding the temperature at the boiling point of water until the crude was dry enough to continue distillation. Continuous cylindrical stills will take care of some water if properly rigged up, but will puke from time to time, due to pockets of water in the crude, discoloring the naphtha.

There are many types of pipe stills suitable for this work, the following is a run of Mexican crude in a Foster heater or pipe still covering 26 days:

Crude run	234,999 Bbls.
Temperature of crude charged	119 F.
Temp. of crude leaving heater	435 F.
Temperature rise in heater	316 F.
Distillate re-run to 56.2 Be. Grav. 85% re-run of Navy specifications	17%
B. U. per lb. crude	180
Fuel burned, sediuum. Gravity 15.2 Baume	3,036.70 Bbls.
Fuel efficiency	70.5%
Fuel in per cent of through put	1.29%
Fuel per barrel run	.542 gals.

First Step

The first step in refining is indicated by (1) on the chart. The crude is pumped continuously through a pipe still or tube still, the temperature of which is held at a point to give sufficient heat to have the oil leaving the pipe still at about 450 F.

From the pipe still the hot oil and evolved vapors enter the separating

Welding Pipe in a Trench, showing the small size and simplicity of the outfit

Welding Pipe Coils with Thermit

What Do You Know About Thermit Pipe Welding?

The Standard Oil Company uses this process on an extensive scale. They wouldn't use it if it did not pay them to do so, would they? So why not find out now how this process can be used to increase the efficiency and promote the economy of your plant. The information is yours for the asking.

YOU WILL OBTAIN BY THE THERMIT PROCESS

1. Welds as strong as the pipe itself, and usually stronger.
2. Welds made wherever the pipe is located.
3. Welds made without the addition of outside heat or power.

AND, these welds are produced with an outfit so light and portable than one man can carry it anywhere, and by a process so simple that it is practically fool-proof, requires no special skill. Anyone can do the work.

The process is particularly useful and economical for welding steam heating coils in oil tanks. Ordinary pipe fittings soon work loose under the constant expansion and contraction to which they are subjected and leak steam into the oil. Thermit welded coils stay tight indefinitely.

Write for Pamphlet No. 1628

THERMIT WELDING

Metal & Thermit Corporation

120 Broadway, New York

Pittsburgh Chicago Boston S. San Francisco Toronto

THERMIT WELDING

Tell them where you saw the ad

drum, which is kept at a uniform temperature in order to prevent any condensation taking place therein. The oil entering the separator flows down onto a spreader, or is sprayed in order to facilitate the release of vapors which are led off through the vapor line and through the condenser.

The residual oil is pumped through an exchanger into a tank provided for this purpose. The vapors in this case were not separated, but led directly through the condensers, a small amount of steam was discharged into the separator and proved very valuable in "knocking back" some of the heavier material.

The naphtha as will be noticed (1) figure 1, is 54.5 Be. gravity, and represents 18.5 per cent of the crude. The residue is 15.0 Be. gravity

Re-Distill Naphtha

The next step is a re-distillation of the naphtha with steam (2a) Figure 1, the gasoline resulting from this distillation is then treated (2b) Figure 1.

The residue or topped crude is subjected to a cracking distillation in 1,000 bbl. cylindrical stills equipped with towers (2) Figure 1, where the topped crude is split into gas oil distillate, gas oil test, paraffin distillate and heavy ends, with a coke residue remaining in the stills. The gas oil distillate (2) Figure 1, which contains a large percentage of cracked naphtha, is re-distilled in reducing stills where the cracked naphtha is removed, the residue is gas oil test.

The paraffin distillate also contains some cracked naphtha which is removed after the paraffin distillate is pressed, and is recovered when the pressed distillate is reduced or distilled for lubricating oil. This cracked naphtha is mixed with the cracked naphtha from the gas oil distillate, and is treated (8) Figure 1 and redistilled for gasoline and is finally mixed with the gasoline made in operation (2b) Figure 1. The paraffin distillate is acid treated, pressed and the pressed oil run in the reducing or lubricating stills (4) Figure 1, for the various lube products. The lubricating oils are treated and finally filtered through Fullers earth.

In this case the character of the foots oil indicates that the paraffin distillate has not been handled to best advantage in the stills during manufacture, as it yields lube oils in fair quantities in proportion to its gas oil yield. The paraffin apparently has been insufficiently cracked in distillation. The yield of foots oil from the sweaters is entirely too large, as an average yield of foots oil from good slack wax should not exceed 40 per cent and is of very little value except as a fuel or to crack in pressure stills. The products as indicated in (9) Figure 1, with the exception of the wax, (which should be in the sweated wax,) should be in the pressed distillate.

Other points worthy of mention are:

(a) The gas oil distillate (2c), Figure 1, could be run through pipe stills to advantage rather than through the cylindrical still as indicated on the chart.

(b) The pipe still should be equipped with dephlegmators in order that a better naphtha product may be obtained.

(c) The yield of lubricating oils is very low and not consistent with the available content of such oils in this crude.

(d) The gas oil as indicated on the chart will not pass U. G. I. specifications for this product.

Apparatus and Methods

First class lubricating oils may be made by distilling the pressed distillate in the presence of caustic soda. The caustic soda is pumped into the still before distillation is started and when the stills are fired up air is introduced to remove the water from the caustic soda solution; then steam is applied as usual. The caustic soda tends to neutralize petroleum acids, destroy sulphur compounds which may be present, and this is of some importance as the lube oils from this crude by ordinary reduction or distillation contain from 1.0 to 2.5 per cent of sulphur.

The lube oils made over caustic soda are better in every respect, the color is good, and the oils have a green appearance by reflected light rather than the purplish-blue cast apparent in the oils made without this treatment. The oils do not break down as readily upon heating, acid treatment is easily effected without danger of emulsification. The disadvantages are longer time required for distillation, and the trouble and expense of cleaning the stills after a few runs.

Water in Crude

In order to take care of the water found in this crude or at least to dispose of it, a settling drum should be placed near the pipe stills, and in the line after the crude has passed the exchanger, to permit the entrained water to settle, and be drawn off, and which would otherwise enter the pipe still and possibly produce some foaming and the deposition of salt on the tubes. The drum should be large enough to reduce the velocity of the oils to such an extent as to permit the water to settle.

Suspension hangers are used with much success for stills in which Mexican crude is run (Fig. 3) on account of the extreme range of temperatures encountered when running this crude to coke, and which produces a maximum of expansion and contraction.

Mexican Naphtha

Comparison of steam and fire distil-

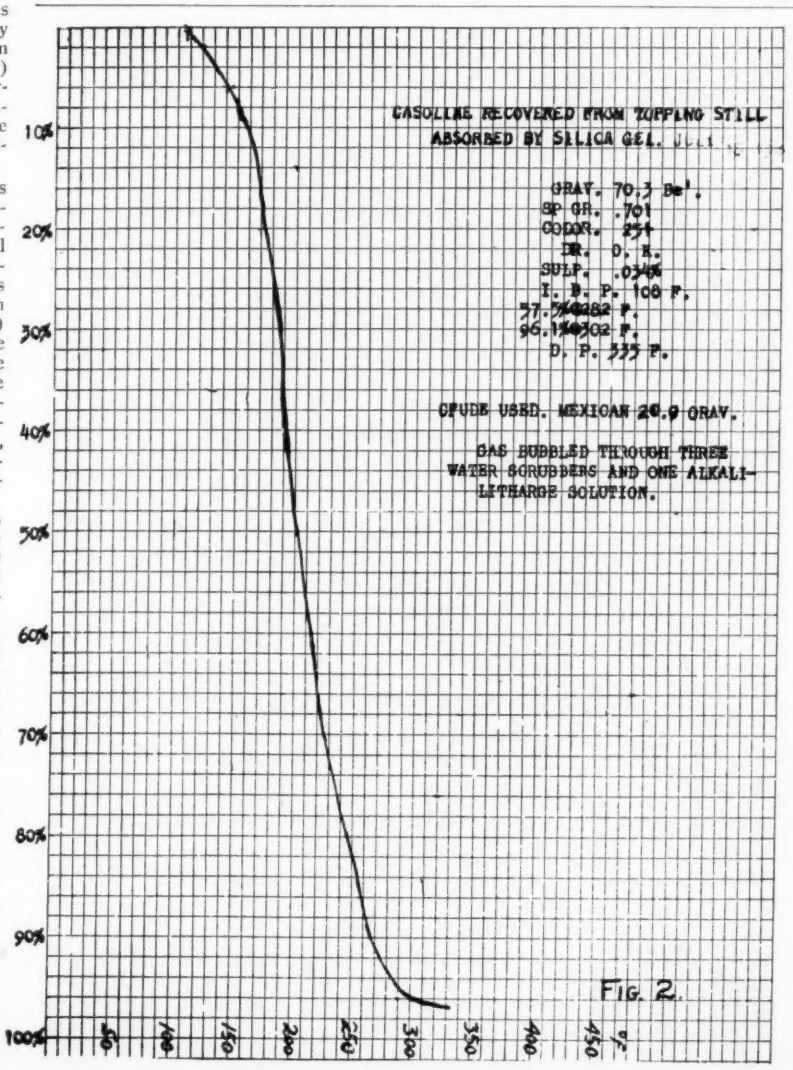
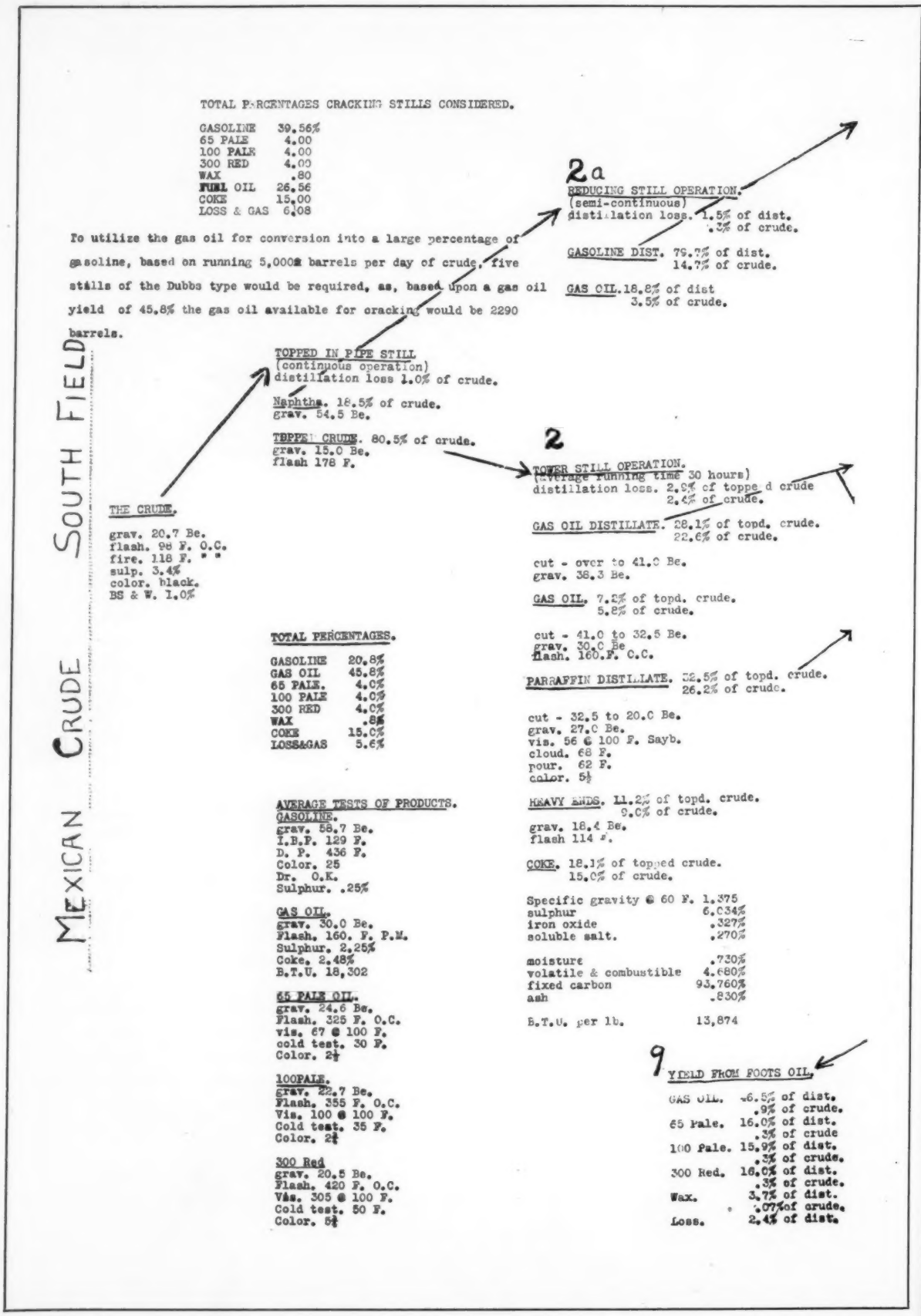


FIG. 2.


MEXICAN CRUDE SOUTH FIELD
THE CRUDE.
grav. 20.7 Be.
flash. 98 F. O.C.
fire. 118 F. " "
sulp. 3.4%
color. black.
BS & W. 1.0%
TOTAL PERCENTAGES CRACKING STILLS CONSIDERED.
GASOLINE 39.56%
65 PALE 4.00
100 PALE 4.00
300 RED 4.00
WAX .80
FUEL OIL 26.56
COKE 15.00
LOSS & GAS 6.08
To utilize the gas oil for conversion into a large percentage of gasoline, based on running 5,000 barrels per day of crude, five stills of the Dubbs type would be required, as, based upon a gas oil yield of 45.8% the gas oil available for cracking would be 2290 barrels.
TOPPED IN PIPE STILL
(continuous operation)
distillation loss 1.0% of crude.
Naphtha. 18.5% of crude.
grav. 54.5 Be.
TOPPED CRUDE. 80.5% of crude.
grav. 15.0 Be.
flash 178 F.
2a
REDUCING STILL OPERATION.
(semi-continuous)
distillation loss. 1.5% of dist.
.3% of crude.
GASOLINE DIST. 79.7% of dist.
14.7% of crude.
GAS OIL. 18.8% of dist
3.5% of crude.
2
TOWER STILL OPERATION.
(average running time 30 hours)
distillation loss. 2.9% of topped crude
2.4% of crude.
GAS OIL DISTILLATE. 28.1% of topd. crude.
22.6% of crude.
cut - over to 41.0 Be.
grav. 38.3 Be.
GAS OIL. 7.2% of topd. crude.
5.8% of crude.
cut - 41.0 to 32.5 Be.
grav. 30.0 Be
flash. 160. F. C.C.
PARRAFFIN DISTILLATE. 32.5% of topd. crude.
26.2% of crude.
cut - 32.5 to 20.0 Be.
grav. 27.0 Be.
vis. 56 @ 100 F. Sayb.
cloud. 68 F.
pour. 62 F.
color. 5½
HEAVY ENDS. 11.2% of topd. crude.
9.0% of crude.
grav. 18.4 Be.
flash 114 F.
COKE. 18.1% of topped crude.
15.0% of crude.
Specific gravity @ 60 F. 1.375
sulphur 6.034%
iron oxide .327%
soluble salt. .270%
moisture .730%
volatile & combustible 4.680%
fixed carbon 93.760%
ash .830%
B.T.U. per lb. 13,874
TOTAL PERCENTAGES.
GASOLINE 20.8%
GAS OIL 45.8%
65 PALE. 4.0%
100 PALE 4.0%
300 RED 4.0%
WAX .8%
COKE 15.0%
LOSS&GAS 5.6%
AVERAGE TESTS OF PRODUCTS.
GASOLINE.
grav. 58.7 Be.
I.B.P. 129 F.
D. P. 436 F.
Color. 25
Dr. O.K.
Sulphur. .25%
GAS OIL.
grav. 30.0 Be.
Flash. 160. F. P.M.
Sulphur. 2.25%
Coke. 2.48%
B.T.U. 18,302
65 PALE OIL.
grav. 24.6 Be.
Flash. 325 F. O.C.
vis. 67 @ 100 F.
cold test. 30 F.
Color. 2½
100PALE.
grav. 22.7 Be.
Flash. 355 F. O.C.
Vis. 100 @ 100 F.
Cold test. 35 F.
Color. 2½
300 Red
grav. 20.5 Be.
Flash. 420 F. O.C.
Vis. 305 @ 100 F.
Cold test. 50 F.
Color. 5½
9
YIELD FROM FOOTS OIL.
GAS OIL. 46.5% of dist.
.9% of crude.
65 Pale. 16.0% of dist.
.3% of crude
100 Pale. 15.9% of dist.
.3% of crude.
300 Red. 16.0% of dist.
.3% of crude.
Wax. 3.7% of dist.
.07% of crude.
Loss. 2.4% of dist.

2b

GASOLINE DIST TREATED with 2.5# of acid per bbl.

Before treat
grav. 58.8 Be.
i.b.p.126 F.
d.p. 453 F.
color. 23
treating loss. 1.66% of dist
.3% of crude.

After treat. 98.34% of dist.
grav. 58.6 Be.14.5% of crude.
i.b.p. 119 F.
d.p. 455 F.
color. 25
dr. o.k.

Fig. 1

8

TREATED CRACKED DIST.
treating loss. 2.57% of dist.
.2% of crude.

grav. 54.3 Be.
Dr. O.K.
97.43% of dist.
8.4% of crude.

TREATED CRACKED DIST.
reducing still operation.
(average run 36 hours.)
distillation loss. 1.5% of dist.
.1% of crude.

Gasoline 74.8% of dist.
6.3% of crude.
cut - over to 18 color.
grav. 58.6 Be.
i.b.p. 132 F.
d.p. 418 F.
color. 25.
R. C.K.

GAS OIL 23.7% of dist.
2.0% of crude.

2c

CRACKED DISTILLATE FROM GAS OIL DIST.
Reducing still operation.
(average run 15 hours)
distillation loss .5% of dist.
.1% of crude.
CRACKED DIST. 38.3% of dist.
8.6% of crude.
cut - over to 46.C Be.
grav. 53.C Be.

GAS OIL TEST. 61.2% of dist.
13.8% of crude.

Treated Paraffin distillate.
treated with 6.5# of acid per bbl.
treating loss - 2.5% of dist.
1.1% of crude.

after treat. 97.43% of dist.
25.0% of crude.
grav. 27.1 B2.
vis. 56 @ 100 F. Sayb.
cloud. 69 F.
pour. 62 F.
color. 3½

3

WAX PRESS OPERATION.
treated p.fe. dist. pressed for slack wax and pressed dist.

Pressed dist. 89.2% of dist.
24.3% of crude.
grav. 26.1 Be.
cold test. 25 F.
vis. 54 @ 100 F. Sayb.

SLACK WAX. 10.8% of dist.
2.9% of crude.
M.P. 106 F.
Oil & moisture. 60%

4

LUBRICATING STILLS OPERATING.
distillation of pressed dist.
(average run 28 hours)
average loss in distillation. .3% of dist.
.07% of crude.

cracked dist.
over to 46.C Be.

gas oil dist.
46.C to 38.C Be.
grav. 38.3 Be.

gas oil. 48.0% of dist.
11.6% of crude.
38.C to 25.C Be.

5

SWEATER OPERATION.
Slack wax sweated for M.P. etc.

Foots oil 72.8% of dist.
2.1% of crude.
grav. 33.9 Be.
flash. 295 F. O.C.
vis. 56 @ 100 F.
cold test. 92 F.

CRUDE WAX. 27.2% of dist.
.7% of crude.

6

CRUDE WAX FILTERED THRU CLAY.
M.P. 127 F. Tag.
color. 25.
grav. 43.C Be.
.73% of crude.

65 pale dist. 16.6% of dist.
4.0% of crude.
25.C to 23.5 Be.
grav. 24.4 Be.
vis. 68 @ 100 F.
Cold test. 29 F.
color. 1½
Treated with lye.
loss negligible.
after treat.
gravity. 24.6 Be.
vis. 65 @ 100. F.
cold test. 30 F.
color 2½
Filtered thru clay.
grav. 24.6 Be.
flash 325.F. O.C.
vis. 67 @ 100 F.
cold test 30 F.
color 2½
3.7% of crude.

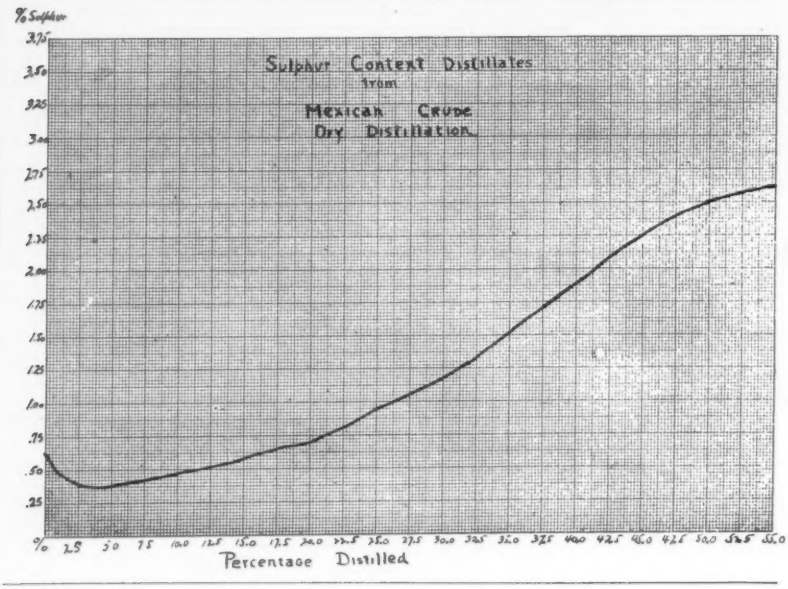
7

100 pale dist. 16.7% of dist.
4.1% of crude
23.5 to off.
grav. 22.5 Be.
vis. 104 @ 100 F.
cold test. 34 F.
color. 2½.
Treated with lye.
loss 1.C% of dist.
after treat.
grav. 22.5 Be.
vis. 104 @ 100 F.
cold test. 36 F.
color. 2½
Filtered thru clay.
grav. 22.7 Be.
flash. 355 F.
vis. 101 @ 100 F.
cold test. 35 F.
color 2½.
3.7% of crude.

7

300 Re dist. 18.4% of dist.
4.5% of crude.
grav. 19.7 Be.
vis. 330 @ 100 F.
cold test. 46 F.
color. red.
Treated with 13# of acid per
treating loss 10.0% of dist.
.4% of crude.
after treat.
grav. 19.8 Be.
vis. 309 @ 100 F.
cold test. 52 F.
color 6.
Filtered thru clay.
grav. 20.5 Be.
flash 420 F.
cold test. 50 F.
vis. 305 @ 100 F.
color 5½
3.7% of crude.

XUM



lations of Mexican naphtha from over to 56.5 Baume average tank gravity.

Dry Distillation With Fire Only

Treated with 5 pounds per barrel 66 degree sulphuric acid.

OVERHEAD DISTILLATE 74.9%

Gravity	60.0 Be.
I. B. P.	129 F.
End point	433 F.
Color	25
Dr.	Neg.
Sulphur	.044%
Odor	Sweet

Distillation continued with fire for kerosene distillate.

Kerosene distillate	17.5%
Gravity	44.6 Be.

Treated with 15 pounds per barrel fuming acid and re-run to test.

Overhead kerosene 90 per cent or 15.7 per cent of charge.

Treated with 15 pounds per barrel 66 degree acid.

Gravity	46.4 Be.
Flash	148 F. T. O. C.
Fire	192 F.
Dr.	Neg.
Sulphur	.145%
Color	25

Residue from both above distillations mixed for gas oil, 8.2 per cent.

Gravity	36.4 Be.
Flash	238 F. P. M.
Sulphur	1.27%

YIELD

Gasoline	74.9%	14.98% of crude
Kerosene	15.7%	3.14% of crude
Gas oil	8.2%	1.64% of crude
Loss	1.2%	.24% of crude

Steam Distillation

OVERHEAD DISTILLATE 76.2%

Gravity	60.7 Be.
I. B. P.	130 F.
End point	430 F.

Treated with 5 pounds per barrel 66 degree sulphuric acid.

Gravity	60.5 Be.
I. B. P.	130 F.
End point	420 F.
Color	25
Dr.	Neg.
Sulphur	.065%
Odor	Sweet

Distillation continued with fire to remove kerosene.

Kerosene distillate 13.8 per cent.

Treated with 15 pounds per barrel of fuming acid.

Re-distilled. Overhead 90% or 12.42% of charge.

Gravity 45.5 Baume.

Treated with 15 pounds per barrel 66 degree acid.

Gravity	45.5 Be.
Flash	156 F. T. O. C.
Fire	190 F.
Sulphur	.160%
Color	25
Dr.	Neg.

Residue from both above distillations mixed for gas oil.

	11.38%
Gravity	35.1 Be.
Flash	240 F. P. M.
Sulphur	1.22%

YIELD

Gasoline	76.2%	15.24% of crude
Kerosene	12.24%	2.45% of crude
Gas oil	11.28%	2.27% of crude
Loss	.18%	.04% of crude

Distillation of Naphtha

(Tops from 20.9 Grav. Mexican Crude)

Fire distillation. Gravity 53.4 Baume.

Cut	Per Cent	Vapor Temp. F.	Baume Gravity	Specific Gravity 60/60 F.
1	1	...	81.2	.6629
2	1	...	84.0	.6542
3	1	...	84.0	.6542
4	1	180	82.0	.6604
5	1	...	79.8	.6697
6	1	200	77.9	.6757
7	1	208	76.2	.6813
8	1	212	74.7	.6862
9	1	218	72.9	.6900
10	1	220	72.0	.6931
11	1	224	70.8	.6972
12	1	228	70.0	.7000
13	1	230	69.2	.7028
14	1	236	68.4	.7056
15	1	240	67.6	.7085
16	1	243	67.1	.7103
17	1	246	66.4	.7128
18	1	250	65.8	.7150
19	1	253	65.1	.7176
20	1	256	64.6	.7190
21	1	258	64.1	.7213
22	1	...	63.5	.7235
23	1	265	63.1	.7250
24	1	268	62.5	.7273
25	1	271	62.0	.7292
26	1	273	61.6	.7307
27	1	276	61.1	.7326
28	1	280	60.7	.7341
29	1	282	60.3	.7357
30	1	285	59.7	.7380
31	1	288	59.1	.7403
32	1	295	58.7	.7419
33	1	298	58.6	.7423
34	1	300	58.6	.7423
35	1	302	57.2	.7479
36	1	304	56.9	.7491
37	1	307	56.6	.7503
38	1	313	55.5	.7547
39	1	316	55.5	.7547
40	1	319	55.2	.7559
41	1	322	55.0	.7568
42	1	325	54.8	.7576
43	1	328	54.4	.7592
44	1	330	54.1	.7605
45	1	333	54.0	.7609
46	1	335	53.8	.7613
47	1	338	53.3	.7638
48	1	340	53.3	.7638
49	1	345	52.7	.7663
50	1	350	52.1	.7688
51	1	355	51.7	.7705
52	1	357	51.5	.7713
53	1	360	51.1	.7731
54	1	362	51.0	.7735
55	1	364	50.7	.7748
56	1	367	50.5	.7756
57	1	370	50.5	.7756
58	1	372	50.3	.7765
59	1	375	50.1	.7773
60	1	380	49.7	.7791
61	1	382	49.5	.7799
62	1	384	49.2	.7812
63	1	387	49.0	.7821
64	1	390	48.7	.7834
65	1	396	48.1	.7861
66	1	400	47.9	.7871
67	1	402	47.7	.7878
68	1	406	47.4	.7892
69	1	414	47.1	.7905
70	1	...	46.9	.7914
71	1	416	46.3	.7949
72	1	420	46.5	.7932
73	1	423	46.1	.7950
74	1	428	45.7	.7968
75	1	431	45.5	.7977
76	1	437	45.1	.7995
77	1	440	44.8	.8009
78	1	444	44.5	.8023
79	1	449	44.4	.8028
80	1	455	44.0	.8046
81	1	460	43.3	.8078
82	1	465	43.0	.8092
83	1	470	42.7	.8107
84	1	473	42.4	.8121
85	1	478	42.2	.8130
86	1	485	41.7	.8154
87	1	490	41.4	.8168
88	1	496	41.1	.8182
89	1	504	40.6	.8206
90	1	514	40.0	.8235
91	1	520	39.5	.8260
92	1	527	38.9	.8289
93	1	535	38.4	.8314
94	1	545	37.7	.8348

Cuts 1 to 50, inclusive, i. b. p. 126 F. end point 391.

Cuts 1 to 59, inclusive, i. b. p. 126 end point 400.

Cuts 1 to 64, inclusive, i. b. p. 128 end point 415.

Cuts 1 to 68, inclusive, end point 433.

Gas From Mexican Crude

Considerable gas is evolved during the distillation of Mexican crude, particularly at the point when the gas oil and paraffin distillate distills. A sample of this gas was found to have a specific gravity of 0.9032 compared with air, and a sample of illuminating gas under the same conditions was 0.616 specific gravity. The gravity was determined by the viscosity method at a temperature of 78 F. and 30.7 inch pressure. This gas is therefore almost as heavy as air at 78 F. and about 50 per cent heavier than carbureted water gas.

Handling Still Gases

In order to take care of the gases evolved during distillation the run down lines from the stills are tapped immediately after leaving the condenser boxes, and are connected to a gas main located on top of the condenser boxes. Small lines are also connected into the look boxes in the receiving house, and these lines led into a six or eight inch gathering line

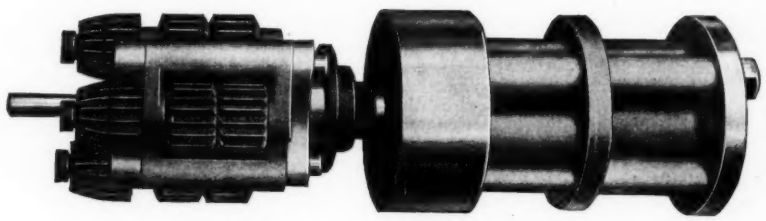
Clean Your Cracking Still Tubes Quickly and Safely

It Will Mean—

(1) Less idle time for the stills
Greater Production

(2) No cutting into or damaging of the tube wall—Long Life to the Tubes

This can be brought about through the use of



Roto Tube Cleaners

They are low in first cost and are inexpensive to keep up.

Let us give you the benefit of our wide experience in the cleaning of cracking stills. Our catalog contains some valuable information—write for your copy.

The Roto Company
HARTFORD, CONN.

Tell them where you saw the ad

which in turn connects into the gas main.

A vacuum is maintained on the entire system by means of two or more exhausters (Roots, Sturtevant or like types are used) in order one or two will always be available.

Too high a vacuum is not desirable, as it causes air to leak into the system and dilutes the gas, rendering it hard to condense should a condensing or absorption system be used. It also causes the stills to plunge, making it difficult for the operator to note the size stream the stills are running.

The still gases are pulled through a wet scrubber or a series of scrubbers to remove a large percentage of the sulphur, etc., before the gas is discharged into the gas holder. The gas holder delivers the gas under a very slight pressure to the different mains which lead to the boiler house, stills, clay burner or anywhere in the plant gas fuel may be utilized.

Apart from the consideration of fuel use, the gas from Mexican crude must be taken care of on account of the toxic effects of such gas, as, should the receiving house become filled with it, the employes in that department would immediately feel its effects.

Gas from this crude, when inhaled, asphyxiates almost instantly. However, recovery is almost as quick if the victim is removed to fresh air. The gas also affects the eyes, causing intense pain and inflammation.

During cold weather there is considerable condensation in the gas mains which accumulates in the connections and other low places, and it is well to provide drips with valves in order that the naphtha may be drawn off. The naphtha thus accumulated contains a large amount of sulphur and is highly unsaturated, as will be noticed in the following results, in which a sample of the naphtha is treated and distilled, another distilled without preliminary treatment.

Naphtha From Gas Main

Gravity 59.2 Baume.

Steam stilled, taking overhead 90%.

Treated with 10 pounds per barrel 66 degree acid.

Gravity	59.8 Be.
I. B. P.	160 F.
End Point	365 F.
Color	Brown

Sample of same material.

Treated with 10 pounds 66 degree acid.

Steamstilled, taking overhead 90%.

Gravity	60.1 Be.
I. B. P.	152 F.
End point	343 F.
Color	25

The offensive of the above naphtha is present in a lesser extent in the regular naphtha from Mexican crude. Brooks[3] states that the odor of kerosene distillates and gasoline is due to the presence of conjugated di-olefines, such as cyclohexadine and cyclopentadiene, which have a sharp, irritating odor suggestive of acrolein or allyl alcohol, rather than the olefines to the offensive odor is commonly attributed.

Laboratory Determination

Determination of the various constituents of the products from this crude may be made in the laboratory.

Aromatic hydrocarbons may be separated by the nitration method, forming nitro-products. The use of sulphur dioxide may also be applied in this determination.

Nitrogen derivaties, homologues of pyridine are separated by sulphuric acid. Nitrogen bases are present in quantity in the naphtha made under pressure from Mexican crude or its products. The simpler nitrogen bases present in naphthas may be liberated by treating the naphtha with copper oxide, and treating the copper oxide compounds with caustic alkali.

Acid compounds — phenols, naphthenic acid, etc., may be removed or separated by dilute alkali. Sulphuric acid may also be used. Unsaturated hydrocarbons are absorbed by conc. sulphuric acid. Solid paraffins are separated by distilling the crude or product in a retort. The distillate is thoroughly mixed and a known weight of the distillate is dissolved in ether-alcohol mixture, then cooled to —20 degrees. The precipitate is filtered through paper on a funnel surrounded by freezing mixture, and the precipitate washed with cooled ether-alcohol mixture.

The resinous bodies, containing oxygen and sulphur, may be adsorbed by filtration through Fullers earth.

Unsaturated Cyclic Hydrocarbons

Holde[4] states that unsaturated cyclic hydrocarbons are separated by the formolite reaction. Brooks suggests that the formolite reaction and so-called "formolite number" are meaningless phrases until the reaction is studied in many cases, not only of cyclohexane, the cyclohexenes, and commercial oils of known chemical character, but also applied to a series of definite pure hydrocarbons of various types.

Aromatics reduce the candle power of kerosene by producing a red coloration of the flame. However, such kerosenes burn with good flame when the aromatics are removed. Borneo kerosene is an example. The salts of naphthenic and sulpho-acids decrease the burning power of kerosene. They may be extracted by agitating the kerosene with dilute Na OH and precipitating the acids by acidifying with mineral acid.

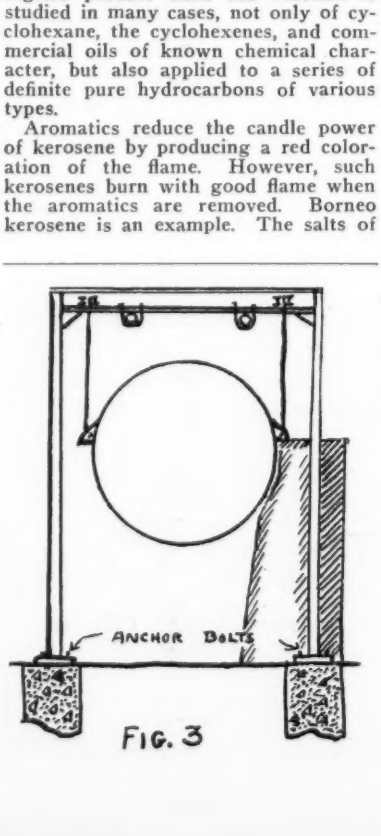


FIG. 3

Typical Analysis of Heavy Mexican Crude

Specific gravity 60/60	0.9895
Baume gravity	11.5
Pounds per gallon	8.244
Flash (open cup)	182 F.
Fire (open cup)	249 F.
Solubility C Cl_4	99.9%
Sloubility 86 Be. napa	83.1%
Oraganic insolubility	Trace
Ash or mineral matter	0.2%
Loss, volatile matter 5 hours@ 325 F.	26.0%
Paraffin scale	0.4%
Total sulphur	4.25%
Fixed carbon	9.0%
Asphalt content @ 100 penetration	70%

The average crude of this type will yield from 18 to 22 per cent of 200 viscosity red lubricating oil. A great deal of this crude is sold for fuel, but it could be refined to better advantage, making lube oils and running gas oil through a cracking unit such as the Cross, Dubbs, Fleming, Jenkins, Holmes-Manley, Burton or other types. Results and products obtained by cracking Mexican gas oil will be given later in this article.

Treating Mexican Distillates

Mexican distillates offer quite a number of distinctly different treating and refining problems. In treating these distillates problems arise that are entirely different from those confronted when treating products from crudes like Mid-Continent, etc., where these distillates contain naphthenes, aromatics, olefins, sulphur and nitrogen compounds in small quantities, the Mexican distillates and particularly those derived from the gas oil distillates which have been subjected to high temperatures, contain larger amounts or aromatics, di-olefins, naphthenic acids, etc., the di-olefins probably producing the resin like substances which separate from such distillates upon standing.

(To be concluded in following issue)

Wichita Falls, Texas.—The Century Oil & Refining Company, which has a combination natural gasoline manfacturing plant and refinery located in South Bend field in Young County, Texas, was placed in receivership November 12. D. E. Stimson of Graham, Texas, has been appointed receiver for the concern, and is continuing to operate the natural gasoline manufacturing plant, which is capable of handling 4,000,000 cubic feet of gas daily. The refinery unit has a daily capacity of 600 barrels. These properties were formally operated under the name of the Fay Petroleum and Refining Company.

Kansas City, Mo.—C. H. Cole, 65 years old, president of the United Iron Works Inc., died at his home here the first part of January. Mr. Cole had been connected with the United Iron Works for more than twenty years and was well known throughout Mid-Continent and eastern refining circles.

Ponca City, Okla.—An expansion and enlargement program is understood to be contemplated here by Empire Refineries Inc., which operates a modern plant in Ponca City.

[3]Chemistry of the non-benzenoid hydrocarbons 102-3.

[4]Examination of hydrocarbon oils. Holde-Solubility 86 Be. napa..... 83.1%

Natural Gasoline Industry on West Coast

Reviewing development of business in California; has had wonderful growth

*By R. E. Becker**

The fact that California is the only oil and gas producing state on the Pacific Coast limits the scope of this paper to a discussion of the development of this industry in California and in reality to six counties of that State. These counties are Fresno, Kern, Orange, Los Angeles, Santa Barbara and Ventura, all lying toward the southern part of the state.

It is true that natural gas occurs in water wells and in dry holes in other parts of the State; by dry holes meaning those drilled in an attempt to obtain oil or gas for fuel purposes. This gas does not contain any gasoline in appreciable quantities. The California State Mining Bureau reports that such gas was used as early as 1858 near Stockton and long before there was any extensive development of petroleum in California. Even after this development had progressed steadily to a point where the annual value of the petroleum was nearly $40,000,000, there was only the beginning of the natural gasoline industry in California and that beginning was one that seemed to bode disaster to the infant industry.

Early in September, 1911, a plant had been completed in the Midway Field of Kern County consisting of eight 80 H. P. direct connected engine compressors with a capacity of over 2,000,000 cubic feet of gas per day and with all the necessary equipment to extract gasoline by the compression method. The piping was all tested out for leaks, the engines were all started as a trial of their operations, but no gas was turned into the plant except that through a 1 1-2 inch line for fuel purposes. The plant had been constructed at a cost of approximately $85,000.00, but no gasoline was made by the installed machinery for nearly five years, when approximately half of the equipment was transferred to another location and a successful plant was put into operation. The next year, 1917, four of the original machines were started and the plant has been in operation ever since making a very satisfactory production.

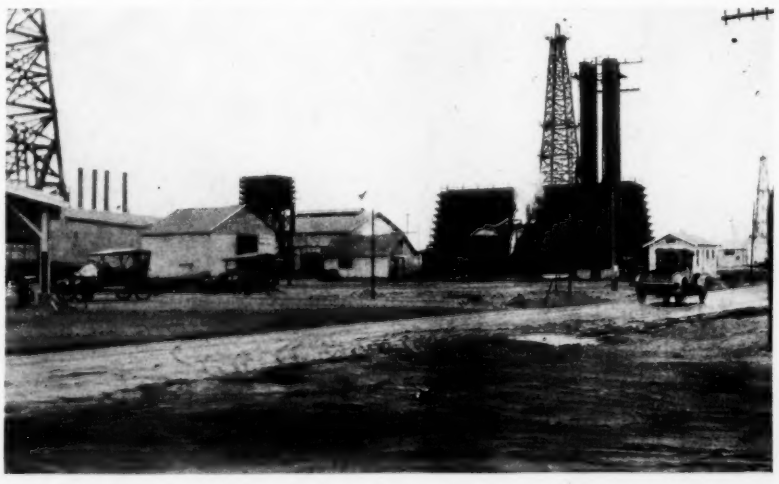
The plant had been constructed under the supervision of a well-known firm of machinery builders, the tests of the machinery were satisfactory since the machinery and installation was paid for and the gas was still available, but the plant was not operating. The answer has been given that there was no market for the product because of the fact that the refiner and consumer were afraid of the so-called casinghead gasoline. The reason for the delay in operating this plant has also been given as follows:

Due to the Lakeview Gusher, the price of oil had dropped to a very low figure, and the market was hard to find. A large buying company was purchasing oil from the plant owner and entered into a contract to take all the production of oil, provided the gasoline plant was not operating. This was because of their knowledge of the amount of gasoline possible to produce from natural gas and the fact that they were averse to having natural gasoline become a commercial product. The plant owner, having to depend on the buying company for the sale of oil, agreed to this condition and the plant was not put in operation during the life of the agreement. The fact that this plant was not in operation was one frequently used in the next few years as an argument against the conservation of the natural gasoline, which by that time was wasting in great quantities, especially in the Midway-Sunset Field. A drop in the price of oil and gasoline occurred about this time to further discourage those who were inclined to try out the new method of "making" gasoline.

In July of 1911, however, the construction of another plant had been started about three miles from the town of Brea, Orange County. This plant consisted of two 60 H. P. engine compressors with a water-cooling system for condensing the gasoline vapors. This was in operation in September, 1911, and proved a more successful venture, as gasoline of about 70 gravity, was produced and sold for blending with heavier crude fractions. The plant extracted about 600 gallons per day from 300.000 cubic feet of gas. The first supply of gas coming from Birch No. 5 well, other wells being connected up as the supply from this good producer fell off. Additions were made to this plant and it was afterward moved to a location near the town of Brea where it is still in operation.

The owners of this plant were in reality the pioneers of the industry in California, as they produced and marketed the first gasoline in the state extracted from natural gas. There were five men interested in this company: Dr. E. H. Liscomb; O. T. Ross; W. J. Wallace; J. H. Henry and J. F. Vordemark, and they organized under the name of the Pacific Gasoline Company. Several of these men have since become very prominently identified with the industry and were responsible for considerable of the growth it has made. The Pacific Gasoline Company of today has grown from the small pioneer company to the largest single producer of natural gasoline in the State, having increased its daily production about 150 times the original amount.

In 1912, several more plants were put in operation, one known as the Hall & Hall consisting of two 50 H. P. engine compressors with water-cooling coils, being put in operation in the Santa Maria Field. The production was marketed from this plant by blending with distillate and retailing as motor fuel, and was a successful venture. In July of 1912, the Dome Plant of the Pinal-Dome Oil Company was put in operation and produced about 40,000 gallons of gasoline per month. This same company put their Pinal Plant in operation in July, 1913, and were soon producing at the rate of 50,000 gallons per month. Other operators in this field to construct plants during this time were the Union Oil Company and the Purity Gasoline Company, each having two units. In 1913 a plant was put in operation which used three stage compression with water cooling and refrigeration. This plant had a capacity of about 1,000,000 cubic feet of gas per day and made a very thorough extraction. It has been in operation until a very short time ago. In May, 1913, the Brea Gasoline Company was ready to operate a three unit plant near the Pacific Gasoline Company's plant at Brea. This Company was formed by several of the pioneers of the Pacific Gasoline Company who had faith in the industry and were willing to back their faith with capital. The successful operation of these plants soon convinced those having gas containing gasoline that they were overlooking something,



Here is a spot where they make gasoline and sell it, too. The absorption gasoline plant is the property of Sandoma Gasoline Company and is located in the Santa Fe Springs field in California. A corner of the filling station is shown to the extreme left.

*Mr. Becker is general superintendent of the Pacific Gasoline Company of Los Angeles.

and the growth of the industry was rather rapid though most of the plants were small.

By the end of the year 1914, other fields of the State contained gasoline plants. The Turner Oil Company had a plant in operation in the Coalinga Fields of Fresno County, which continued in successful operation until the advent of the absorption plant in this field. The Midway Field of Kern County had a small absorption plant using crude oil as an absorbent. We understand that this plant was started in 1912 and is still in operation producing about 200 gallons per day. In 1914, the Midway Gasoline Company started construction of a plant to treat gas produced on a section of property belonging to the North American Consolidated Oil Company three miles north of Taft. The originators of this company were the same pioneers who had invested capital in the Brea Gasoline Co. During the construction of this plant, it was considered that over 3,000,000 cubic feet of gas per day would be available. When the plant was ready to operate in September of that year, the well producing most of the gas stopped flowing and the two units installed were very short on gas supply, and it began to appear as if this venture, as in the previous compression plant in this field, would be a failure.

It was during this year that the Montebello Oil Company started a plant with a capacity of 1000 gallons per day near Fillmore in Ventura County. The Standard Oil Company had operated a small plant near Newhall, which was, however, considered as an experimental plant and was shut down within a short time. The Union Oil Company started a second plant at Santa Maria and the Western Gasoline Company and the Rice Ranch Oil Company also had plants in operation in this field. The Columbia Oil Producing Company had a plant operating in Puente Hills, the A. F. Gilmore Company one at La Brea, Hurley, Smith & Collins one at Sherman and one at Oleo. The Standard Oil Company had a plant in the Coyote Hills and the Olinda Gasoline Company one at Olinda.

The total production from these plants for the year 1914 was 7,587,000 gallons with a value of $633,517 at an average market price of 8.36 cents per gallon. This placed California third in production by states and the production had risen from nine per cent of the total to 18 per cent of the natural gasoline produced in the United States in three years of the life of the industry. The industry was now on a firm foundation among the small producers, but, as yet, the larger producers seemed inclined to frown on the product, and it was only by blending with the crude oil and extracting the production along with the straight run gasoline that they could be induced to market the natural gasoline. It was evident, however, that the industry was here to stay and that the proper procedure was to regulate the handling of the product to eliminate any dangers that might be encountered.

The increased faith in the industry caused a further increase in activity in 1915 and 1916 when several of the larger operators either leased their gas on a royalty basis to natural gasoline companies or built their own plants for compressing the gas and extracting the gasoline, after which the gas was in a marketable condition at a better price than when sold at the well. This was noticeable in the Midway-Sunset field to a marked degree, as in 1915 there was only one plant in operation with a production of 2000 gallons per day, while in 1916, there were five plants in operation producing over 10,000 gallons per day.

Early in 1915, the Kern Trading and Oil Company, operating on thousands of acres in the Midway field, allowed the Midway Gasoline Company to experiment with the gas produced from one well near the gasoline company's plant. The gas production of this well was about 600,000 cubic feet per day, and when put through the plant a production of around 2000 gallons per day was obtained. This was, probably, the richest gas of any quantity being treated at that time, and it was afterward found to be almost the richest gas produced in that field. An arrangement was made for a supply of gas from the Kern Trading and Oil Company's property to the Midway Gasoline Company and the capacity of the plant was doubled. Shortly afterward, the Puritan Oil Company built a four unit compression plant on Kern Trading and Oil Company's property and the Sixteen Oil Company built a plant on the Southern California Gas Company's property, both of these being under the same management as the Midway Gasoline Company. The Standard Oil Company erected a 3000 horsepower gas compressing plant for compressing the gas up to 300 pounds pressure in order to deliver the natural gas to the surrounding field and town. Gasoline

Shipping Facilities
At Your Command

—a fleet of over 1,000 tank cars.
—of all sizes and types to meet your requirements.
—always in top-notch condition.
—at low rental charges.
—storage facilities at Clearing, Ill., Blue Island, Ill., and Tulsa, Okla.

In addition we maintain three repair shops located at Chicago, Ill., Coffeyville, Kans., and Tulsa, Okla. Fully equipped to do repair work of all kinds.

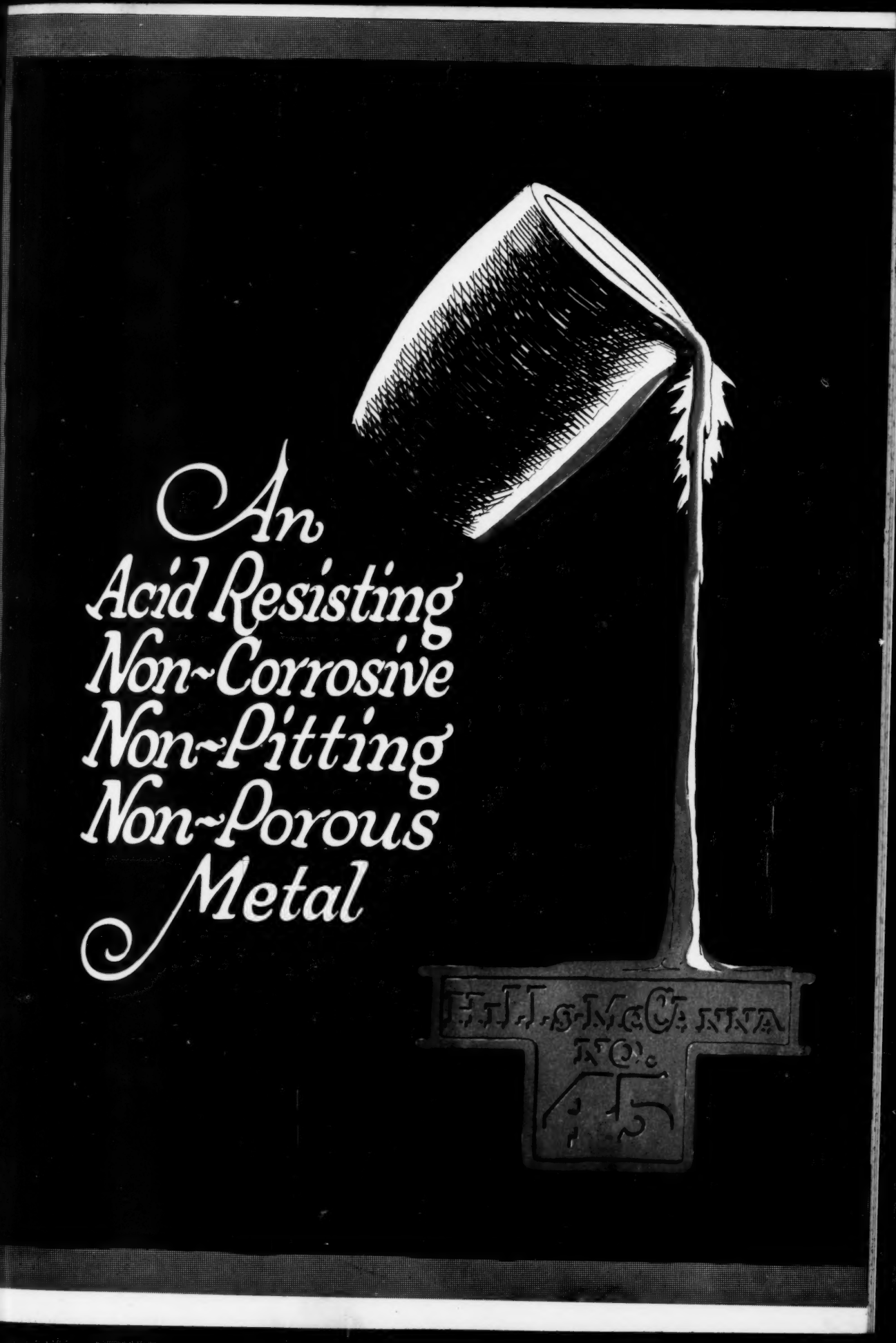
Ask for further Information

Car Repairing
Steel Plate Work

North American Car Co.
327 S. LaSalle St., Chicago

Car Works: Chicago, Coffeyville, Tulsa
Southwestern District Office Petroleum Bldg., Tulsa

NORTH AMERICAN CAR CO.
LESSORS OF TANK CARS


An
Acid Resisting
Non-Corrosive
Non-Pitting
Non-Porous
Metal

HILLS-McCANNA NO. 45

STILL PLUGS
Made in Any Size or Shape

you
h acid
part
ls-Mc
inate

ill plu
momet
ing in
its, wh
withsta
on and
acement

The physi pertie
plus the knowled king
respo nsible for th adv
offers. (For de scrip

We carry still
wells, hammers, etc.
shapes, b ut what you
up to your order. ample

Valve

Hills ~ McCann C

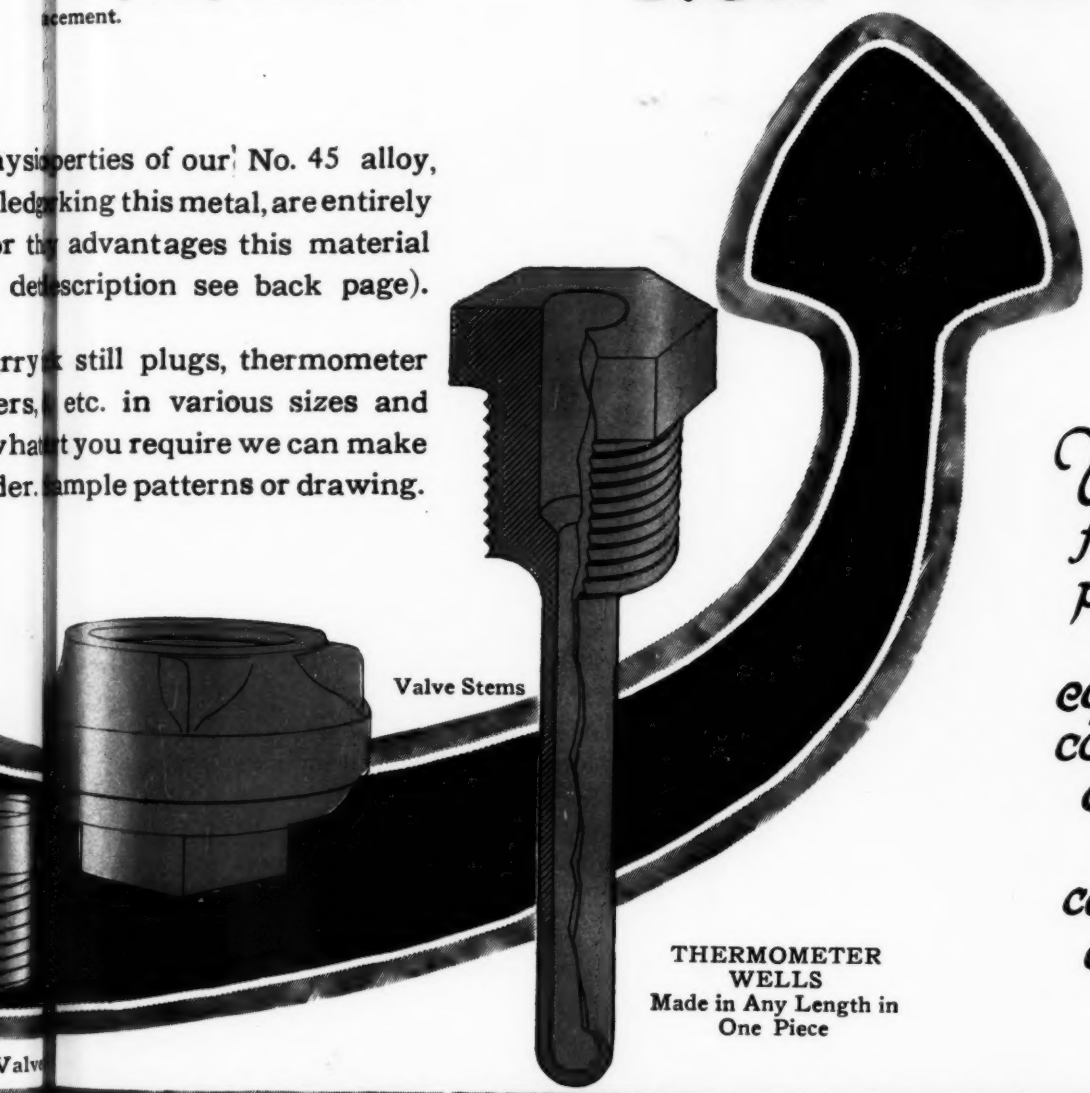
you are having difficulty
h acid corrosion or pitting in
parts of your equipment,
ls-McCanna No. 45 alloy will
inate that difficulty.

ill plugs, valve seats and stems,
mometer wells and other parts
ing in contact with corrosive
ts, when made of our No. 45 al-
withstand the ravages of acid cor-
n and give long service without
acement.

Acid Resisting Non-Corrosive Non-Pitting Non-Porous

ysi perties of our No. 45 alloy,
ledg king this metal, are entirely
r th advantages this material
de scription see back page).

rry k still plugs, thermometer
ers, etc. in various sizes and
vhat t you require we can make
der. ample patterns or drawing.



Valve Stems

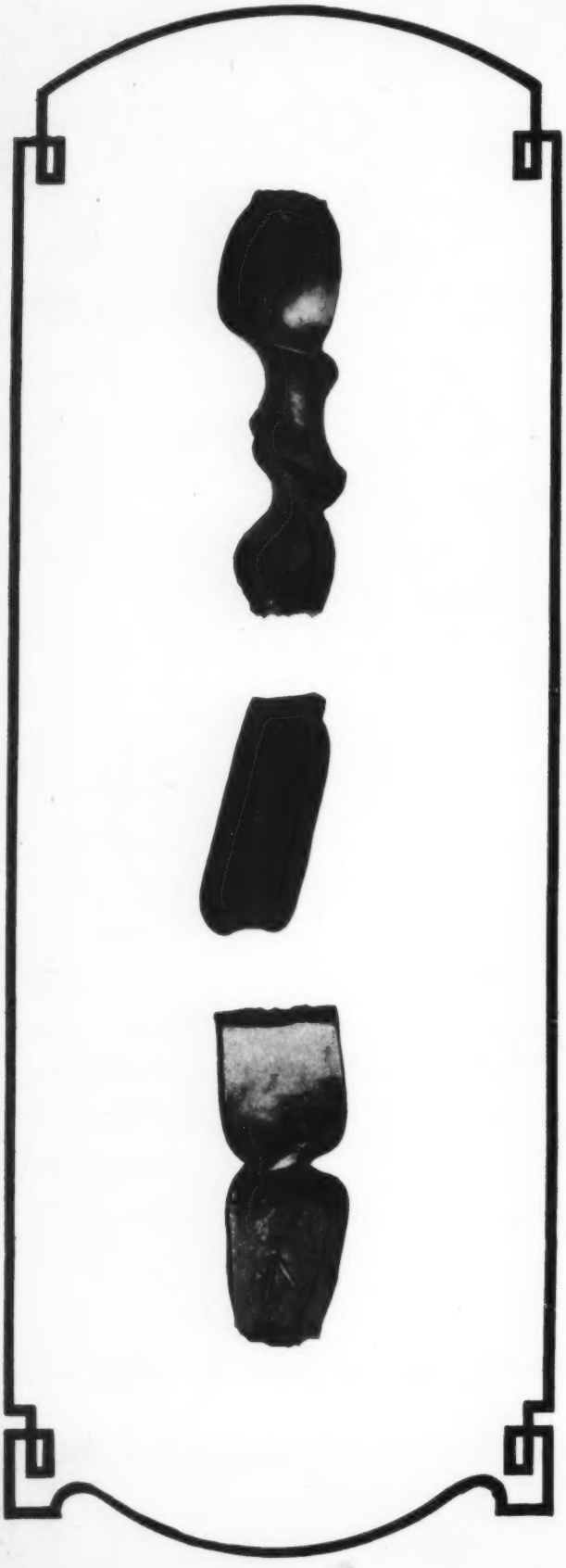
THERMOMETER WELLS
Made in Any Length in One Piece

Use it for any part of your equipment coming in contact with corrosive agents

Valv

n Co. 2025 Elston Ave. CHICAGO

XUM



What Hills-McCanna No. 45 Is

Numerous tests have been made of our No. 45 alloy. The Armour Institute of Technology gives most interesting figures on tensile strength of our No. 45 alloy at varying temperatures:

The physical properties shown herewith are a fair average.

Tensile Strength	73,000 lbs.
Yield Point	12,000 lbs.
Elongation	43%
Reduction of Area	36%

Acid tests give the following figures:

95% Sulphuric Acid	50%
Water	50%
Temperature	100°-110°
Duration of Test	35 Days
Result: Loss in Weight	.032%

The cuts at the left illustrate additional interesting features about this remarkable alloy. The fact that this metal can be twisted as shown, without fracture, proves unusual toughness and ductility.

No. 45 is a copper-aluminum-iron alloy possessing physical properties which make it very desirable for use in oil refineries and other uses where acid corrosion is encountered. Having a co-efficient of expansion 50% greater than steel, it first came into prominence in still plugs, because it allowed the plug to be removed without damage to the recess or plug itself, for when cooled down, a comparatively loose-fitting closure permits of easy removal.

The thermal-conductivity of this metal also makes it very desirable for use in thermometer wells, giving a quick reading at all times.

Valve seats and stems made of this material give service indefinitely without replacement.

Fire hazard is greatly reduced where hammers, chisels, and other tools made of our No. 45 alloy are used. No. 45 will not throw sparks.

If there is any part of your equipment in which any of the above features will solve a problem, send drawings, patterns, or description to us, and we will make up the parts to order.

HILLS-McCANNA CO.

2025 Elston Ave.
CHICAGO

was absorbed from this gas by using crude oil as an absorbent. The Fellows Gasoline Company constructed a four unit plant near Fellows to handle gas from the C. C. M. O. property, the Sunset Gasoline Company erected a plant on the property of the St. Helens Oil Company and both the La Habra Gasoline Company and the Richfield Oil Company put plants into operation in the Midway-Sunset field. All of the independent companies were using the compression method of obtaining gasoline and the development of the expander had reached its stage such that all of the commercial gasoline was being obtained.

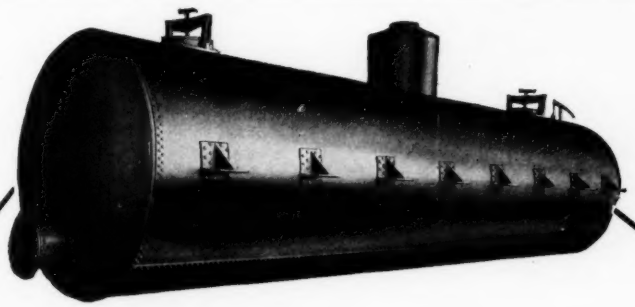
About this time, however, the absorption process was clamoring for recognition and a plant was put into successful operation at Coalinga in 1916. Heretofore, the absorption of gasoline was limited to the enrichment of crude oil, this being delivered to refineries as far as 300 miles away, where the gasoline was extracted by distillation and sold as straight run. The Union Oil Company was purchasing the production from several plants in the Midway field making compression gasoline of as high as 80 gravity, pumping it into the crude oil lines and then on to its refinery. A refinement of this method is now used by the Associated Oil Company, in as much as by the use of pressure tanks at each pumping plant the oil is not allowed to leave the pipe lines in its 300 mile journey.

In 1916 an absorption plant was built to extract the gasoline from the tail gas of the Puritan Oil Company's compression plant, but was unsuccessful in obtaining an increased yield. This plant was put into use later to extract gasoline from an individual well having gas already under pressure. About half a gallon per 1000 cubic feet was extracted in this way, whereas the compressor plants were extracting about one and one-half gallons. It was extremely hard at that time to obtain accurate determinations of the amount of gasoline in a sample of gas, and although it was known that the gas obtained under pressure was not as rich as the casinghead gas, the fact that a poor production was obtained coupled with the unsuccessful operation on the tail gas of the compression expander plant gave the absorption method a poor reputation with the Wallace Refineries, which was an amalgamation of the old Pacific Gasoline Company, the Brea Gasoline Company, Midway Gasoline Company, Puritan Oil Company, and Sixteen Oil Company.

In 1917, experiments were being made at the Union Oil Company's 2000 horsepower plant at Santa Maria, and within a short time this plant was changed over to a highly successful absorption plant. This plant is still in operation producing a major portion of this field's 25,000 gallons per day. In 1918, the Associated Oil Company put a plant into operation in the Midway field using the absorption method of extracting the gasoline at a pressure of about 30 pounds. The gasoline production was not up to expectations, due to the rapid falling off of the gas supply and to incomplete extraction.

The advantages and disadvantages were now a subject of much debate. The utilization of most of the gas being produced from oil wells required a certain amount of pressure and in cooling the compressed gas, some gasoline was obtained. The first users of the absorption method usually combined the two in this way, having the absorbers strip out what gasoline the cooling coils did not obtain. We have regarded such plants as absorption plants, however, as contrasted with plants making the final extraction by refrigeration, either by the expansion of the natural gas or ammonia. It was gradually conceded that although the production by the obsorption method was often not as great as by the compression method, when properly designed expanders and heat exchangers were used, much lower compression pressures are used and the product is more stable, so that a far greater proportion of it is saleable.

By the end of 1921, the absorption process had obtained a firm foothold and grown rapidly in favor as is shown by the production of that year, when 21,273,000 gallons were produced by the absorption method compared with 36,947,000 gallons by the compression method. A better understanding of the underlying principles of absorption plant operation and design had been obtained and many of the early problems have been solved. New plants being put in were almost invariably absorption plants, even when higher pressures were required for transmission of the gas. The production of im-



GOOD STILLS
DON'T JUST HAPPEN

They are the result of intensive study and research in properly designing; a plant suitably equipped and employing the highest type of skilled labor, and the knowledge of right materials for manufacturing.

"UNITED STILLS"

are double riveted throughout. One piece head-flanged and dished. Fire course is one sheet of still bottom steel. Shells built with **four seams horizontally—NO ROUNDABOUT SEAMS,** offering less possibility of leaks. Lugs are our design of built-up steel plate.

"United" Stills are made in our big plant located at Iola, Kansas—in the heart of the Mid-Continent Fields. "United" offers you quick delivery, low freight rates and products unexcelled in quality.

UNITED IRON WORKS, Inc.
KANSAS CITY, MO.

TULSA, OKLA.
612 Mayo Bldg.

DALLAS. TEX.
1411 Kirby Bldg.

"UNITED" IRON WORKS INC. FOR SERVICE

mense amounts of gas in the Elk Hills of Kern County required the erection of six gasoline plants and there were all absorptions plants though most of the gas is compressed to 300 pounds for delivery to the Midway Gas Company. One of these plants was built by the Wallace Refineries, three by the Standard Oil Company, one by the Pan American Oil Company, and the sixth was a small unit plant compressing gas for fuel which only operated a short time.

Several other methods of gasoline extraction have been experimented with but found no very large application. The use of ammonia refrigeration was tried for cooling the gas, but was only adopted by two or three operators. One plant operating on gas at 425 pounds pressure was constructed to refrigerate the condensate and circulate it through towers in order to cool the gas and thus extract the gasoline. Trouble with freezing water in the absorbers and heat exchangers caused a change to the use of calcium brine instead of gasoline with somewhat better success. The gas going through this plant contained about one quart of gasoline per 1000 cubic feet and the extraction of all marketable gasoline is almost complete. The gas is delivered to Los Angeles by the Midway Gas Company, which installed four 1000 horsepower Cooper gas engine compressors in the Midway field in 1913 and have made several enlargements since. The charcoal absorption method of extraction is so far only used for testing and to our knowledge, no commercial plants are in operation in this state.

The use of large units for both gas compression and gasoline extraction has largely been abandoned and the installation of from 150 to 165 horsepower units are the rule for engines with absorption unit capacities from from 1,000,000 to 7,000,000 cubic feet. The tendency seems to be toward much higher absorbing towers, several being in operation whose height is 90 feet, and a great many of 70 feet. More attention is also paid to having adequate cooling towers for both gas and vapors.

We are including herewith table showing a comparison of the number of absorption and compression plants in each field of the state, together with the best figures obtainable on the daily production in gallons.

PRESENT STATUS OF INDUSTRY

Field—	No. of Plants Abs.	Comp.	Daily Prod. Gallons
Coalinga	1	..	2,000
Midway-Sunset	16	11	120,900
Elk Hills	5	..	18,600
Santa Maria	3	2	26,800
Ventura	4	..	2,800
Fillmore-Santa Paula	..	3	11,300
Salt Lake	..	4	4,600
Whittier, Fullerton, Brea	7	9	34,850
Santa Fe Springs	10	2	81,650
Huntington Beach	9	..	48,000
Long Beach	13	..	103,000
Totals	68	31	444,500

This table shows that at present there are over twice as many absorption plants as there are compression plants and the average size plant is capable of producing about 4500 gallons of gasoline per day. An estimate of the amount of gas handled at all the plants in the state is 475,000,000 cubic feet per day, or an average gasoline content of one gallon per 1000. An estimate of the amount of capital invested in this industry at the present time is $18,000,000 for plant equipment and pipe lines.

At the present time there are in operation 99 gasoline extraction plants compared with 73 in 1921, 70 in 1920, and 60 in 1919. This great growth within the last year has been occasioned largely by the tremendous growth of oil production in Orange and Los Angeles Counties. The volume of gas now being produced and containing from one-half to two gallons of gasoline per 1000 cubic feet has been estimated at 335,000,000 cubic feet per day for the three new fields, Long Beach, Huntington Beach and Santa Fe Springs. For the treatment of this immense amount of gas, there are in operation 32 absorption plants and two compression plants whose combined capacity is approximately 225,000,000 cubic feet of gas per day. There are also about 15 plants being built, varying in capacity from 1,000,000 cubic feet to 20,000,000 cubic feet per day. The end of the present expansion is not yet in sight, although the production will, probably, be somewhat curtailed by the recent decreases in the market price of gasoline, and unless an outlet is found for the casinghead production, a further slump in the casinghead market may occur.

Much credit is due the small operator for the present status of the indus-

"Has Formed A Perfect Stone Coating"

E. R. Riggs, owner of the above Riggs Refinery, after having TNEMEC Paint on all his Steel Stock and Storage Tanks for one year, enthusiastically recommends it as follows:

"It has now been one year since we used your TNEMEC Paint for the painting of our Steel Stock and Storage Tanks.

"The color of this Paint is still good and it seems to have formed a perfect stone coating. We consider it an ideal paint for Steel Tanks and all metal covered buildings around a Refinery.

"We desire to inform you that this paint has proved entirely satisfactory and are gladly recommending it to our friends."

Its cement content makes TNEMEC Paint ideal for Refinery uses and on Storage Tanks.

Ask Continental Supply Co., our distributors to the industry, about Tnemec Paint.

Tnemec Paint & Oil Co.

3121 Roanoke Road, Kansas City, Mo.
Chicago Office: 122 S. Michigan Av.

Why not have your own copy?

The man who is either managing or working for a refinery or gasoline plant has every reason to read a business paper telling what is going on in that industry.

During the past year The Refiner and Natural Gasoline Manufacturer has printed more than 50 articles of a technical nature of direct interest to refiners and natural gasoline plant people.

If you are reading a copy subscribed to by your company, or a sample copy, why not send in a dollar today and have the Refiner and Natural Gasoline Manufacturer sent to your home, where you can keep a file?

The cost is $1 per year

USE THE COUPON NOW!

The REFINER and NATURAL GASOLINE MANUFACTURER,
Box 1307, Houston, Texas.

Gentlemen: Please find enclosed one dollar (check or currency will do) for which send me your publication for one year.

Name.....

With.....Company

Street and No.....

City.....

State.....

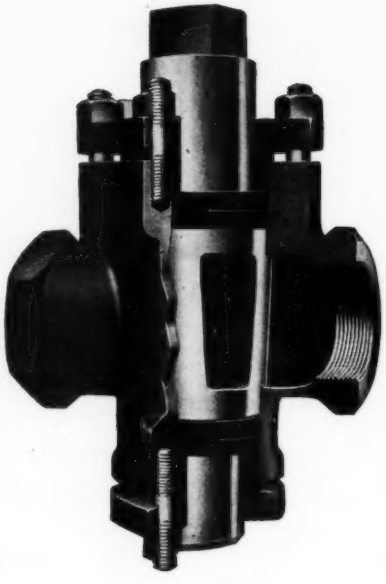
Refinery
Executive
Superintendent
Other Employee

Natural Gasoline Plant
Executive
Superintendent
Other Employee

(BE SURE TO CHECK CLASSIFICATION)

ACID-TAR VALVES

Acid-Tar is a by-product of petroleum refining which presents an unusual valve problem. Besides being constructed of an acid-resisting material, valves must be peculiarly adapted to handling this sticky, semi-solid fluid, containing all the impurities removed from lubricating oils during treatment.



The Victory FcH Double Packed Stop Cock Valve answers these requirements. It is a stop cock valve of unusual simplicity and rugged construction. The positive and lasting adjustment provided by the two stuffing boxes, which between them cushion the plug in two directions, results in dependable operation under adverse circumstances. The protection of seats, and the fact that operation cannot be interfered with even by complete solidification of the material are of great importance.

Features Fully Patented

Victory Bronze is highly resistant to corrosion by dilute sulphuric acid, and possesses good physical properties as well.

The success of the combination of this metal with the double packed construction is attested by the satisfaction of refiners who have standardized on Victory Valves for such work.

Complete catalog on request

Victory Manufacturing Company

100 Main Street **Niles, California**

DISTRIBUTORS:

Wm. Braat, Woolworth Bldg., New York City, N. Y.
V. A. Houghton Co., 566 W. Washington Blvd., Chicago, Ill.
Western Supply Co., Tulsa, Okla.
Norvel Wilder Co., Beaumont, Houston and Mildred, Texas, Shreveport, La.
Engr. Equipment Co., Union League Bldg., Los Angeles, Calif.
G. J. Gillespie, Suffolk House, 5 Laurence Pountney Hill, London, E. C. 4.
Midwest Piping and Supply Co., St. Louis, Mo.
Geo. F. Akers Co., 3000 Grand River Ave., Detroit, Michigan.

Tell them where you saw the ad

try as the pioneers who took a chance and made good. The several firms of machinery manufacturers who have been prominent in the industry also deserve much credit both for keeping the industry alive and in scattering the information and experiences of all operators to those interested. Many of the first operators purchased and obtained their first machinery by paying the freight from Eastern points, having been given credit in order to get the plant into operation when capital was lacking. These same firms keep in close touch with the industry and have available information which in the present status can be obtained from no other source. We are indebted to the Bessemer Gas Engine Company, Ingersoll-Rand Company and Western Gas Engine Company, as well as numerous gasoline and oil company representatives for information and assistance in preparing this paper.

The natural gasoline industry in California has grown from its birth to the present time overcoming the prejudice of the oil refiner, the fear of the consumer, and all the disadvantages of being thousands of miles away from the raw materials of manufacture. Up to the present time, it has had the advantage of a demand for commercial gasoline in excess of the supply. The time seems at hand when the assistance of an association of natural gasoline manufacturers is badly needed to stabilize the industry and give all its members the benefits of co-operation and provide a means of scattering trustworthy information concerning its activities and products if its progress is to continue.

Philadelphia, Pa.—Construction work is well under way at the 10,000 barrel refinery of Sinclair Refining Company at Marcus Hook, Pa. At the present rate of speed it is believed the project will have been completed by the latter part of 1924.

PAUL GERHARD,
Mid-Continent representative of the M. W. Kellogg Company.

Leaky Valve Causes Big North Texas Fire

Wichita Falls, Texas.—Fire caused by a leaky valve on a pipe still at the Miller Petroleum Company's refinery here January 1, resulted in painful injuries being sustained by D. L. Sellers, a refinery workman, while attemping to combat the spreading flames. The blaze was extinguished before any great amount of property damage was done, while the injured workman was taken to a hospital.

Long Beach, Calif.—The Parfection Refinery company's new plant here started to running oil through the stills early in December.

The plant is drawing its crude from the Long Beach field.

Two New Stills for Long Beach Refinery

Los Angeles, Calif.—The Crump-Steele Company at Long Beach late in November added two new 1000-barrel tubular stills to its small plant and in December was adding a third with a capacity of 1500 barrels.

The enlarged plant should ge operating full capacity within a short time.

Santa Barbara, Cal.—A recess until the first part of January has been taken in the hearing of the $100,000,000 damage suit of the Universal Oil Products Company against the Standard Oil Company (Indiana) involving patent processes for refining crude oil.

"New Era" Absorber Trap

Is Not a Steam Trap

Designed expressly for Absorbers

Made in sizes to handle all the oil from Absorbers without the loss of any gas under any pressure and gravity and without any changes or adjustments.

These Traps do not become inoperative with oil and water.

An absolutely new creation.

Sold with an unconditional guarantee

Write us your needs

VALVE ENGINEERING COMPANY

66-72 Hamilton Street, Cambridge, Mass.

BIGGS

Field Storage and

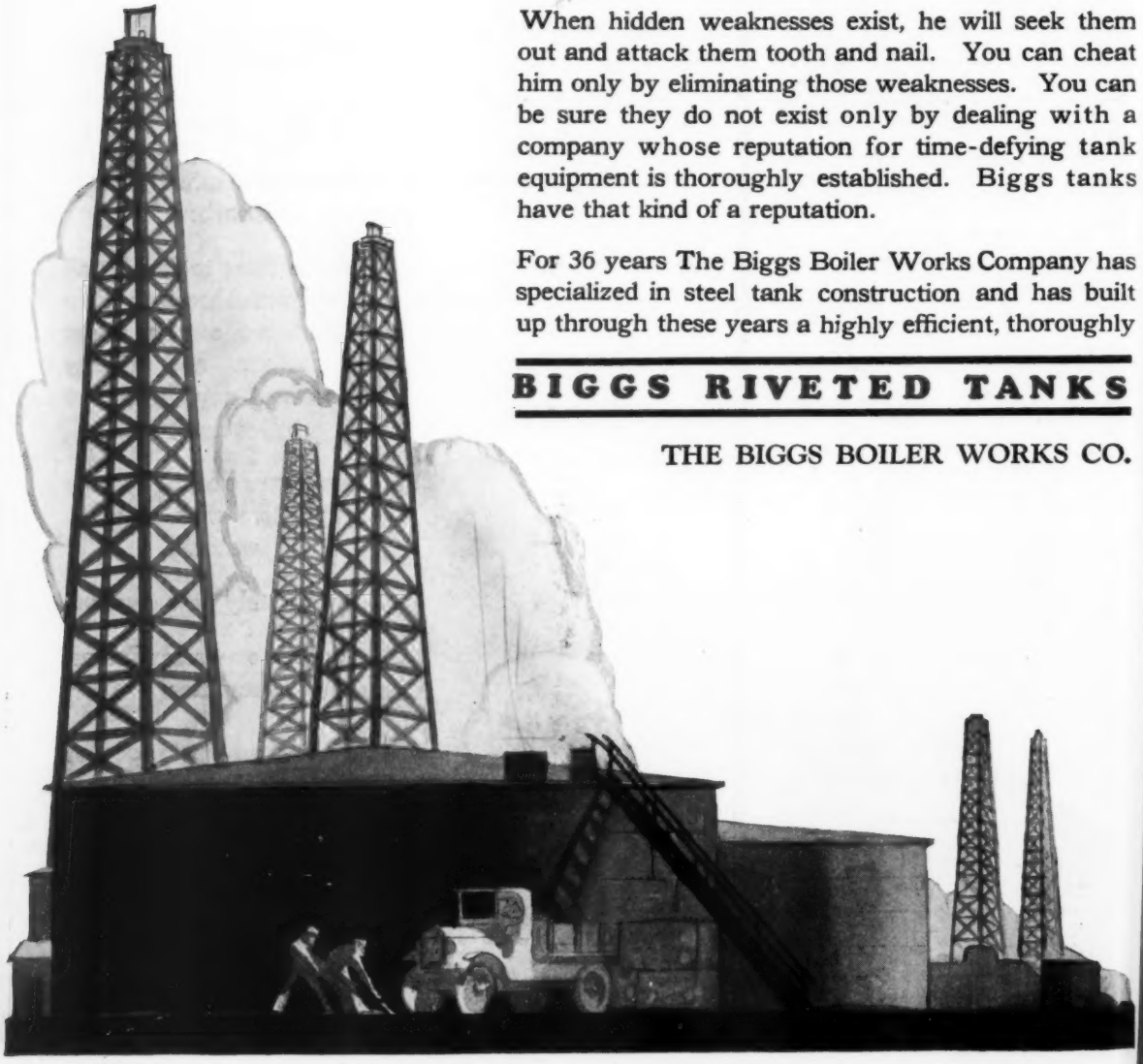
A STEEL tank may be just a tank to the human eye but Father Time has keener eyesight.

When hidden weaknesses exist, he will seek them out and attack them tooth and nail. You can cheat him only by eliminating those weaknesses. You can be sure they do not exist only by dealing with a company whose reputation for time-defying tank equipment is thoroughly established. Biggs tanks have that kind of a reputation.

For 36 years The Biggs Boiler Works Company has specialized in steel tank construction and has built up through these years a highly efficient, thoroughly

BIGGS RIVETED TANKS

THE BIGGS BOILER WORKS CO.



Tell them where you saw the ad

TANKS
Refinery Equipment

equipped plant to back up its knowledge of what a tank should be.

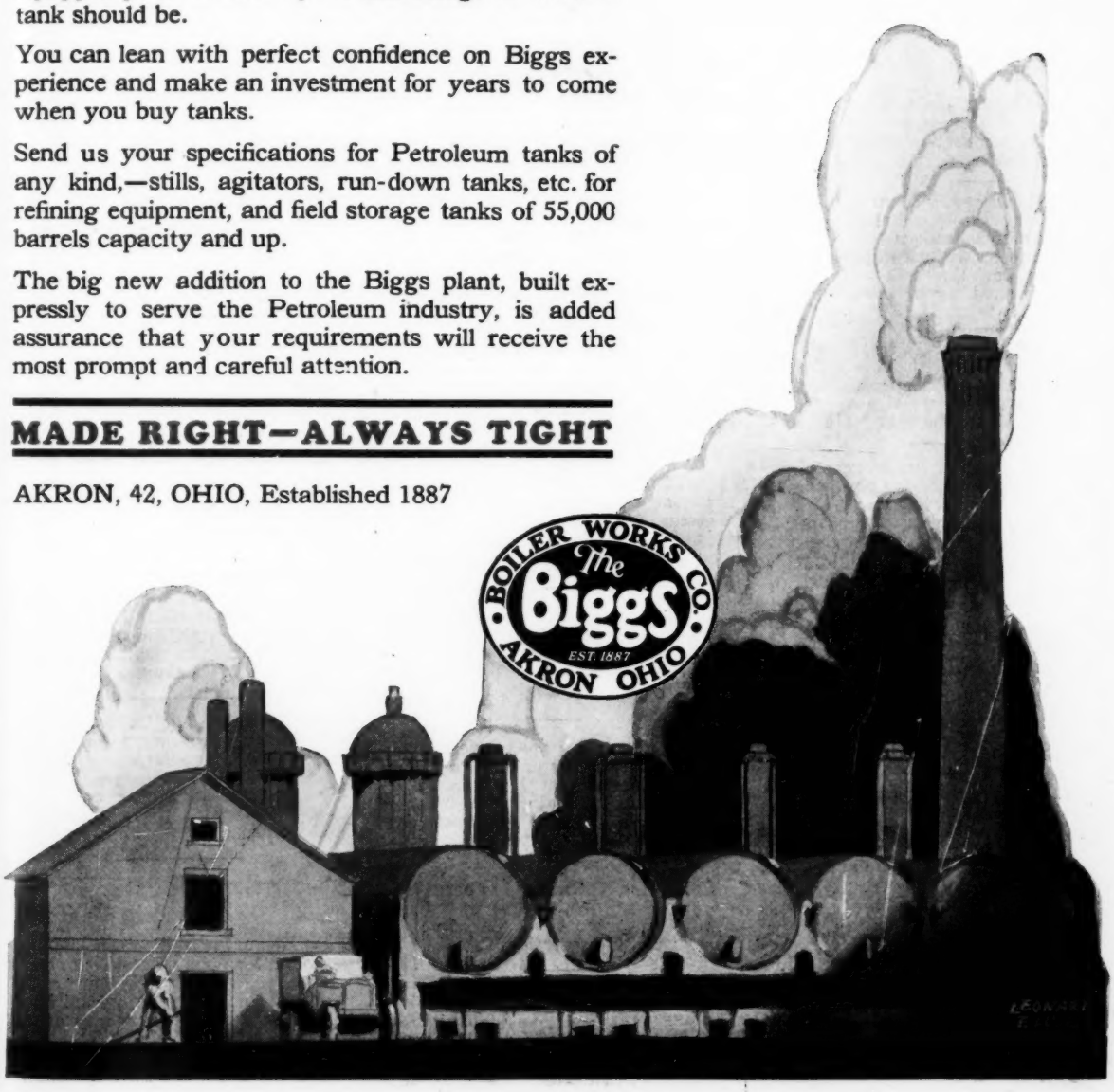
You can lean with perfect confidence on Biggs experience and make an investment for years to come when you buy tanks.

Send us your specifications for Petroleum tanks of any kind,—stills, agitators, run-down tanks, etc. for refining equipment, and field storage tanks of 55,000 barrels capacity and up.

The big new addition to the Biggs plant, built expressly to serve the Petroleum industry, is added assurance that your requirements will receive the most prompt and careful attention.

MADE RIGHT—ALWAYS TIGHT

AKRON, 42, OHIO, Established 1887



Tell them where you saw the ad

PERSONNEL OF THE INDUSTRY

Dr. Roy Cross of Kansas City, who with his brother invented the Cross cracking process used at many refineries, was visiting in California early in December. During the past month the Gasoline Products Company, a concern organized to place the Cross process, established a branch office in Los Angeles.

R. R. Irwin of the White Eagle Oil and Refining Company has been elected chairman of the board of the Oil Men's Club of Kansas City.

R. J. Sharpe, representative in Tulsa of the General American Tank Car Corporation, was in Chicago last month in connection with company business.

R. R. Rakestraw, vice president of the Western Refining Company, headquarters at Los Angeles, is in Europe arranging for the sale of products from his company's refinery.

L. L. Stephens of Pierre, South Dakota, commander of the South Dakota department of the American Legion, has been named general attorney for the Standard Oil Company (Indiana).

General offices of Producers and Refiners Corporation which has been located in the Wrigley building in Chicago are being brought back to Denver, Colorado. Only a sales office for the company will be maintained in Chicago.

A. N. Noyes, of the Hills-McCanna Company was in Houston during the past week.

H. C. Fowler of the Amalgamated Oil Company of California has accepted a position with the United States Bureau of Mines with headquarters at Bartlesville, Oklahoma.

J. J. Rheil, general manager of the Cabin Creek refinery of the Pure Oil Company at Cabin Creek, West Virginia, died recently at a Charleston, West Virginia, hospital as the result of an operation.

F .W. Fraley, vice president of the Sinclair Refining Company, left Houston on a business trip to New Orleans.

Dayton-Dowd Company, manufacturers of centrifugal pumps, Quincy, Illinois, announce the opening of a consolidated sales office at 30 N. Michigan Avenue, Chicago, Ill.

LIONEL T. BARNESTON,
First Vice President of the General Petroleum Corporation, one of the largest refiners and natural gasoline manufacturers on the West Coast

W. G. Cummings, president of the Gas Engineering and Construction Company of Pittsburgh and Tulsa, has returned to Tulsa after an extended business trip to the West Coast.

St. Clair B. Byrne, in the refining department of the Texas Company at Houston, is making an extensive trip, visiting all refineries of the Texas Company and also the New York office.

C. Wilbur Miller, president of the Davison Chemical Company of Baltimore, returned to the United States last month after a trip abroad which included a stay in England.

E. M. Corah, for several years manager and part owner of the Transatlantic Oil Company at Houston, is recovering from a major operation performed at a Houston sanitarium last week.

Col. James H. Graham has been elected president of the Indian Refining Company, succeeding Theodore L. Pomeroy who has resigned.

Mid-Continent offices of the American Schaeffer and Budenberg Corporation of Brooklyn, New York, now are located at 805 Mayo building in Tulsa. O. F. Kluenter is in charge.

J. E. Huffine, president of the Grandfield Oil and Refining Company of Grandfield, Oklahoma, was a Tulsa visitor recently.

Frank Phillips of Bartlesville, Oklahoma, president of Phillips Petroleum Company, was in New York the latter part of December.

E. W. Marland, president of Marland Oil Company of Ponca City, Oklahoma, was host recently to a party of prominent oil men in the Mid-Continent, including Jas. J. McGraw, Waite Phillips, E. R. Perry, Carl Dresser, J. L. Shakely, R. Otis McClintock and others.

Harry Hassan, manager of the Dallas office of the Sinclair Refining Company and one of the most active purchasers of refined products from independent refiners in Texas, Louisiana and Arkansas, was a business visitor in New York City for several days prior to the holiday season.

L. N. Oppenheimer, formerly vice president of Sapulpa Refining Company has become vice president of the Champion Oil Company with offices in Tulsa.

Bartlesville, Okla.—Phillips Petroleum Company has started work on another gasoline plant in Osage county, Oklahoma, to be of 3 units and located in the northeast quarter of section 9-27-5e.

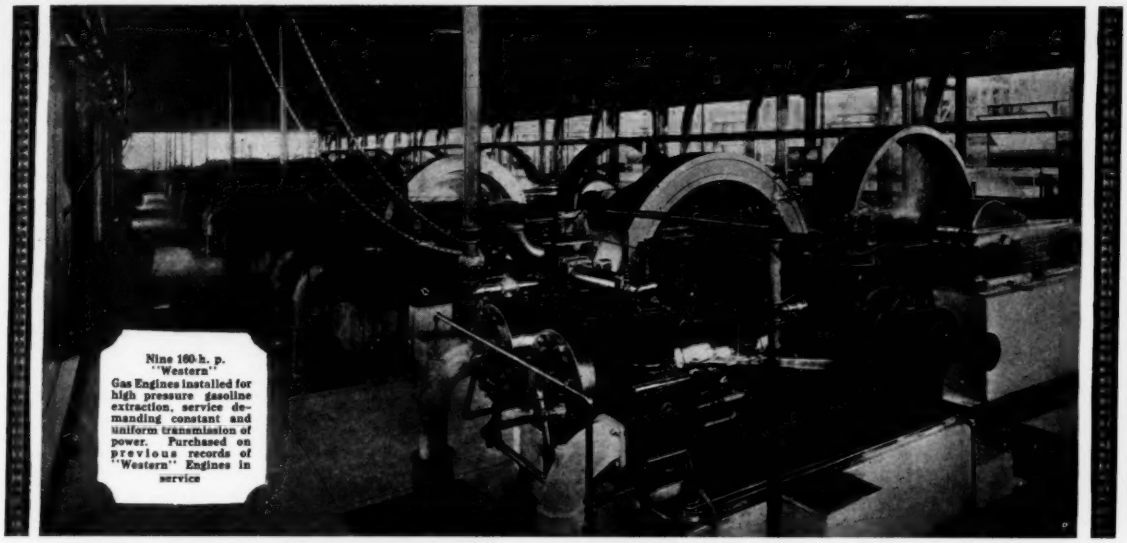
Tulsa, Okla.—The Mid-Kansas Oil and Gas Company (Ohio Oil Company) has begun work on a natural gasoline plant of 10 units in section 15-27-5e in Osage county, Oklahoma.

Camden, Ark.—The Dubbs process is to be installed in a new refinery to be built on the Tyson farm near here by the Houston Oil Company, according to an announcement by company officials. The plant is to have a capacity of 5,000 barrels.

Jet Petroleum Plant Started in California

San Diego, Calif.—Construction work has started on the plant being erected for the Jet Petroleum Company at National City and when completed it will have a daily charging capacity of 2500 barrels.

The Angeles Snowolene Company of Los Angeles will furnish the crude for


Nine 160-h. p.
"Western"
Gas Engines installed for high pressure gasoline extraction, service demanding constant and uniform transmission of power. Purchased on previous records of "Western" Engines in service

MAINTENANCE COST
Less than 20¢ per unit per day

"Western" Duplex Gas Engines in oil country service during a period of five years, operating continuously, and twenty-four hours a day for months at a time, have records showing maintenance costs as low as $72.00 per unit per year.

These records were not made under ideal conditions arranged for test purposes, but in actual service under the complete supervision and control of the company operating them.

Such records with definite figures covering performance and costs, most convincingly prove "Western" supremacy in efficiency, economy and dependability, and are available to any operating company on request.

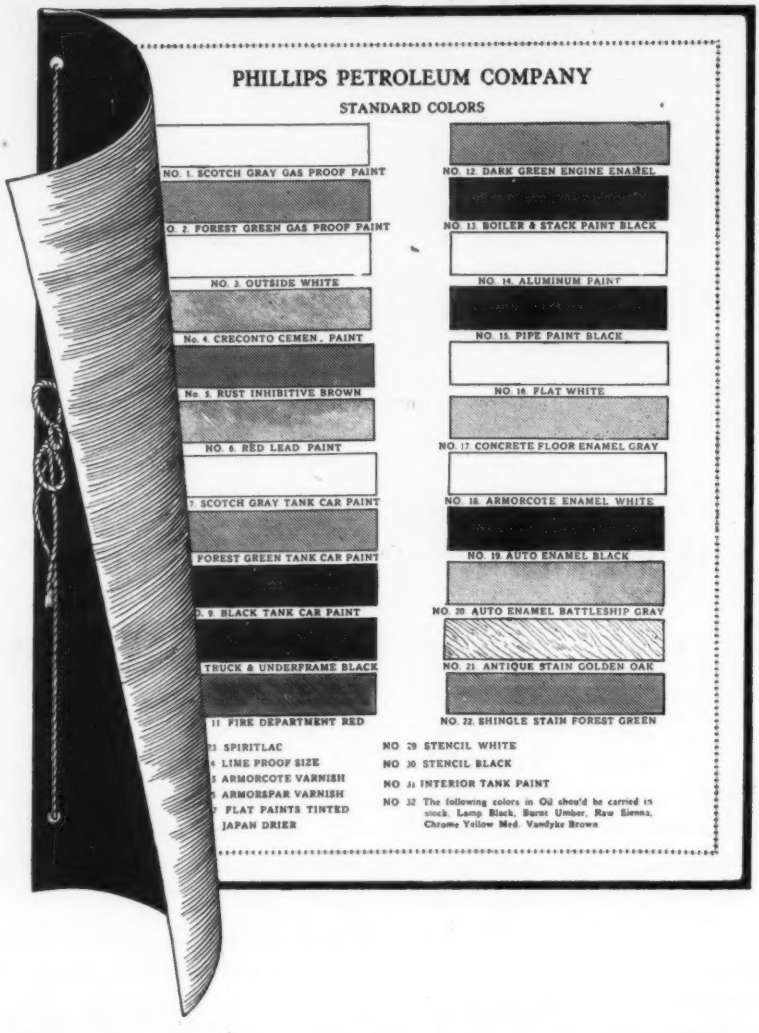
For gasoline extraction, pumping, boosting and general power purposes in refinery service.
40-320 h.p. One, Two and Four Cylinder Units.
Catalog No. 503

Western Machinery Company

General Offices and Factory:
903 North Main Street, Los Angeles, California, U. S. A.

BRANCHES:

Tulsa, Oklahoma
Okmulgee, Oklahoma
San Francisco, California
Bakersfield, California


PHILLIPS PETROLEUM COMPANY
STANDARD COLORS
NO. 1. SCOTCH GRAY GAS PROOF PAINT
O. 2. FOREST GREEN GAS PROOF PAINT
NO. 3. OUTSIDE WHITE
No. 4. CRECONTO CEMEN. PAINT
No. 5. RUST INHIBITIVE BROWN
NO. 6. RED LEAD PAINT
7. SCOTCH GRAY TANK CAR PAINT
FOREST GREEN TANK CAR PAINT
D. 9. BLACK TANK CAR PAINT
TRUCK & UNDERFRAME BLACK
11 FIRE DEPARTMENT RED
3 SPIRITLAC
4 LINE PROOF SIZE
5 ARMORCOTE VARNISH
6 ARMORSPAR VARNISH
7 FLAT PAINTS TINTED
JAPAN DRIER
NO. 12. DARK GREEN ENGINE ENAMEL
NO. 13. BOILER & STACK PAINT BLACK
NO. 14. ALUMINUM PAINT
NO. 15. PIPE PAINT BLACK
NO. 16. FLAT WHITE
NO. 17 CONCRETE FLOOR ENAMEL GRAY
NO. 18. ARMORCOTE ENAMEL WHITE
NO. 19. AUTO ENAMEL BLACK
NO. 20 AUTO ENAMEL BATTLESHIP GRAY
NO. 21. ANTIQUE STAIN GOLDEN OAK
NO. 22. SHINGLE STAIN FOREST GREEN
NO 29 STENCIL WHITE
NO 30 STENCIL BLACK
NO 31 INTERIOR TANK PAINT
NO 32 The following colors in Oil shou'd be carried in stock. Lamp Black, Burnt Umber, Raw Sienna, Chrome Yellow Med. Vandyke Brown

A Special Paint Service for Refiners

Many of the large Refiners, to whom we sell paint, have standardized their colors and paints for all the various equipment about their Refinery. They also have a standard practice for applying these paints. For these Refiners, we have prepared special color charts outlining standard painting practice for all their equipment.

These standard instructions for applying and ordering all paints result in simplification and economy in buying and put the paint department on a most efficient basis.

If you are interested in having us make up such a chart for your paint department, drop us a line in care of the Industrial Department.

COOK PAINT & VARNISH CO.

KANSAS CITY, MO.

Oklahoma City Omaha Fort Worth Wichita

Tell them where you saw the ad

Refinery Has Own Paint Testing Station

Has iron bound rule that all paints offered for sale first time must stand test before purchase is made

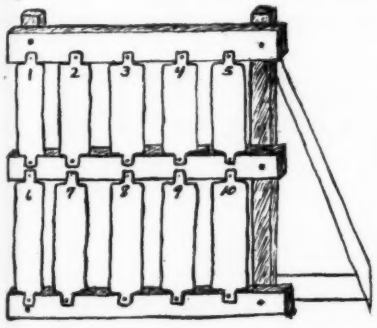
By A. R. McTee

The accompanying article is not offered as the final solution to paint buying, but as the method which one company uses. It has its good points as well as its drawbacks. The principal drawback is that the refinery which uses this system must do all of its own experimental work instead of profiting to some extent from the experimental work already done by some other reputable concern.—Editor.

BUYING paint solely on its merit has long since become an applied doctrine with the Humble Oil and Refining Company. This organization no longer risks using a paint that has not been thoroughly tested for several months under the direction and supervision of a paint foreman, a man employed to make sure that no inferior surfacing is applied to any property belonging to the Humble company.

When a representative from a paint company calls on the superintendent of the Humble refinery, he is asked to submit samples of his product to the paint foreman. A long sales talk is unnecessary. The paint salesman merely wastes the time of the superintendent by going into a technical discussion of paint, for it is an iron-bound rule that no paint shall be bought until after it has stood the test on the Humble company's test fence.

The idea of some practical means whereby paint might be tried out before purchased resulted from numerous experiences with coatings of paint that did not stay on. Counting the waste of actual money with which these paints were bought and the loss from evaporation, these experiences were dearly paid for. Some of the paint lasted nine months, and some did not



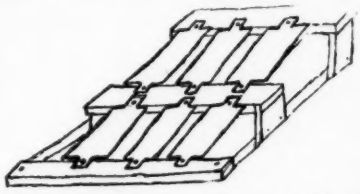
last that long. With the system of testing in use now, paints that show deterioration within a short time are not considered. Comparisons can be made with those that stand up well under the conditions of exposure, and it becomes a simple matter to determine which paint will give the best results for the money involved.

The test fence consists of two parts; one part is a wooden frame to which sheets of metal can be attached, placed in a vertical position on the top of a building. The other part consists of the same kind of a frame placed at the exact pitch of a tank roof. By using two frames, the tests give results for surfaces at the vertical and also at the horizontal. Tests on the vertical fence are considered as good indications of what the paint will do on the wall of a tank. Results obtained from the frame of the same pitch as the tank roof show what may be expected when the paint is actually put on the roof, with the understanding, of course, that the roof will be free of water sprays, leaks, etc.

In order that the test might be as severe as possible, a building was selected where conditions of exposure would be worst. Fumes from the acid plant, vapor from the boilers, smoke, dirt, rain, and sunshine all have a direct shot at the test fence. No protection of any kind exists. The building is about eighteen feet high, and both fences are on top of this building.

When a sample of paint is received, it is applied to a clean metal sheet, the same thickness of the tank wall or roof. In fact the metal sheet is cut from the same metal of which the tank is built. These sheets are cut in shops at the refinery, and they are supposed to be exactly the same condition at the time the paint is applied as though it were being put on the tank itself. Each sheet is painted on both sides in order to avoid any discrepencies that might result from differences in exposure of the two sides of the same sheet. The sheet is cleaned first; then a filler of red lead is applied, then a coat of gray is put on, and finally a third coat of whatever paint is to be tested, is applied.

Each sheet is numbered. A complete record of each sheet is kept from the date on which the paint is put on until the test is considered as finished. The sheets are examined from time to time and notes are entered in the record book. Each examination date is record-



ed, and by glancing at the record book, it can be definitely determined what each test is doing. For instance, if a paint begins to blister, a note is made showing the date when this defect was discovered. Comparisons are then made with other paint put on at the same time, and it becomes an easy matter to check up and see which paint is really giving service under the conditions that will exist when it is put on the tank or applied to a building.

One man has charge of all the testing. No element of personality enters the process. When a paint falls down, it is dropped from the book. Naturally such a paint would never be considered when buying time comes along.

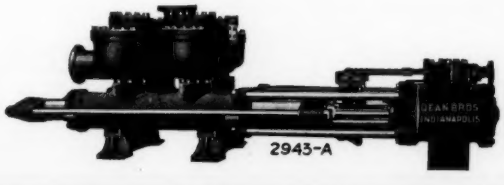
New York, N. Y.—Refining as well as other properties of the White Oil Corporation have been taken over by the United Central Oil Corporation, the new Delaware company.

DEAN BROS. CO.
INDIANAPOLIS.

OIL PUMPS
For Hard Continuous Service

The pumps will not short stroke. Are substantially and carefully built. Have large and free passages which do not restrict the flow. Extremely economical in the use of steam.

Send for Catalogue.



The Reeves Vertical Gas Engine-Compressors for Gas Booster Plants

A few of the reasons why leading companies and engineers are purchasing the Reeves Gas Engines and Compressors.

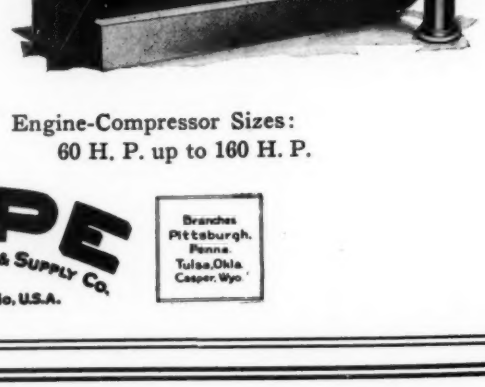
They know the Reeves unit is not an experiment, having proven its reliability and worth over a period of about twenty years successful service.

Account of the simplicity of operation; low fuel and maintenance cost per horse power. One user just reported having operated last four units 16 months without shutdown.

All Compressors equipped with "Hope" Biplane, Patented, easy operating, high speed Valves.

Saving in installation time partly pays for unit.

Saving in plant construction cost from 20 to 50 per cent depending on location.



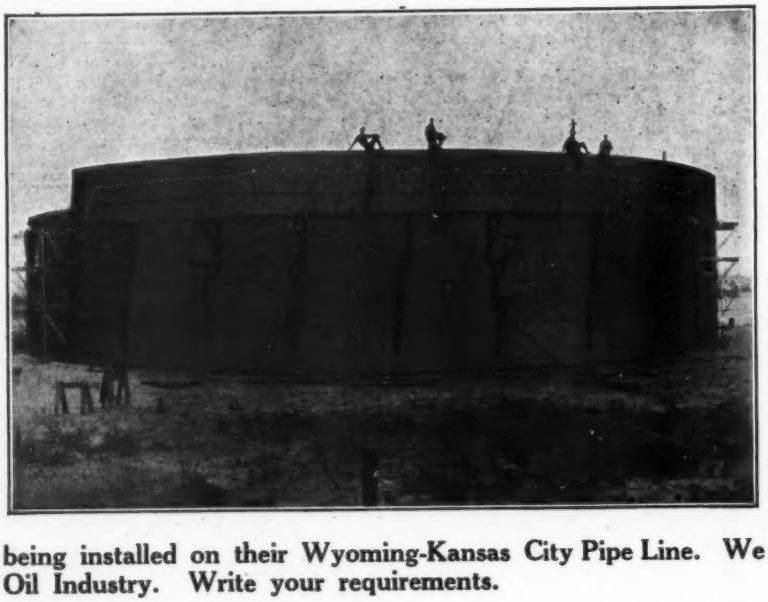
Engine Sizes:
40 H. P. up to 250 H. P.

Engine-Compressor Sizes:
60 H. P. up to 160 H. P.

Consulting and Contracting Engineers in Natural Gas and Oil.

HOPE ENGINEERING & SUPPLY Co.
Mt. Vernon, Ohio, U.S.A.

Branches Pittsburgh, Penna. Tulsa, Okla. Casper, Wyo.



55,000 Barrel All-Steel Gas-Tight TANK

being erected for Sinclair Pipe Line Company at North Platte, Nebraska. One of thirty same size being installed on their Wyoming-Kansas City Pipe Line. We make "everything" for the Oil Industry. Write your requirements.

Kansas City Structural Steel Company

"Nearest the Field"

GENERAL OFFICES:
21st and Metropolitan Ave.,
Kansas City, Kansas

SALES OFFICES:
505 Huntzinger Bldg., Kansas City, Mo.
809 Daniels Bldg., Tulsa, Oklahoma

Tell them where you saw the ad

Mid-Continent Refinery Operations

As of December 15, 1923

ARKANSAS

Plant and Location—	Capacity	Now Running
Abner Davis, El Dorado	60	S D
Airedale Ref. Co., El Dorado	1,000	S D
Arkansas Ref. Co., Fort Smith	1,000	S D
Ouachita O. & R. Co., El Dorado	1,000	750
El Dorado Pipe Line & Ref. Co., El Dorado	2,000	S D
Farmer O. & R. Co., Texarkana	1,000	175
Four States Ref. Co., Texarkana	400	S D
Griscon Ref. Co., El Dorado	750	S D
Home Ref. Co., Hot Springs	500	100
Jones Bros. & Tatum, El Dorado	1,000	S D
Kettle Creek Ref. Co., Pearson	2,000	3,100
Lion Oil & Ref. Co., El Dorado	12,000	7,550
Newark Ref. Co., El Dorado	1,500	S D
Pine Bluff Ref. Co., Pine Bluff	1,500	850
Root Refineries, El Dorado	3,000	1,400
Shippers Pet. Co., El Dorado	1,800	S D
The Arkansas Ref. Co., Picron	3,000	S D
Union Pipe Line & Ref Co., El Dorado	4,000	S D
Total for Arkansas	36,960	

KANSAS

Associat'd P. & R. Co., El Dorado	1,000	S D
Bell P. & R. Co., El Dorado	700	S D
Commonw'lth O. & R. Co., Moran	800	S D
Derby Oil & Ref. Co., Wichita	5,000	1,850
Chem. Oil & Gas Co., Osawatomie	1,000	S D
Eldorado Ref. Co., Eldorado	4,000	1,600
Frontier Ref. Co., Hutchinson	2,000	S D
Golden Rule Ref. Co., Wichita	800	550
Great Western Pet. Co., Florence	2,000	S D
Great Western Ref. Co., Erie	1,500	S D
Industrial Ref. Co., El Dorado	1,500	750
Kanotex Ref. Co., Arkansas City	3,000	3,600
Kansas City Ref. Co., Kansas City	5,000	4,500
Kansas Oil Ref. Co., Coffeyville	2,000	S D
Kan. Tex. Oil Ref. Co., Wichita	1,500	S D
Interstate Ref. Inc., Centropolis	1,000	480
Lesh Ref. Co., Arkansas City	1,500	S D
The Grant Oil Co., Augusta	2,500	800
Skelly Oil Co., Eldorado	12,000	7,200
Mutual Oil Co., Chanute	1,500	S D
Mecca Ref. Co., Augusta	2,500	S D
Marshall & Co., Sheffield	2,500	S D
Moore Ref. Co., Arkansas City	4,500	2,200
McCree Pet. Co., Baxter Springs	600	S D
McWhorter - Chanute Ref. Co., Chanute	200	S D
Miller Pet. Co., Humbolt	1,500	1,350
Nat. Ref. Co., Coffeyville	5,000	5,000
North Amer. Ref. Co., Rosedale	700	S D
Peerless O. & R. Co., Chanute	3,600	1,850
Richardson Ref. Co., Eldorado	2,000	280
Red Bird Ref. Co., Fredonia	800	S D
Roxana Ref. Co., Arkansas City	10,000	5,000
Sinclair Ref. Co., Argentine	6,000	7,000
Sinclair Ref. Co., Coffeyville	7,000	6,000
Sterline Oil & Ref. Co., Wichita	5,000	S D
Standard Oil Co., (Kansas) Neodesha	12,000	S D
Uncle Sam Oil Co., Argentine	700	S D
Uncle Sam Oil Co., Cherryvale	2,400	S D
Vickers Pet. Co., Potwin	1,800	1,400
White Eagle O. & R. Co., Augusta	6,500	6,600
Total for Kansas	117,250	

LOUISIANA

Caddo Central Oil & Ref. Co., Shreveort	3,500	3,100
Caddo Central Oil & Ref. Co., Shreveport	7,000	4,800
International O. & G. Co., Cedar Springs	800	S D
Homer Ref. Co., Homer	250	S D
Leeton Ref. Co., Shreveport	1,000	S D
Louisiana Pet. Prod. Co., Bossier	6,000	S D
Louisiana O. & R. Co., Shreveport	6,000	6,000
Red River Ref. Co., Crichton	1,800	S D
Paramont Pet. Co., Superior	3,000	S D
Rogers Ref. Co., Shreveport	1,500	S D
Shreveport P. & R. Co., Shreveport	4,500	4,100
Tar Island Ref. Co., Mooringsport	300	S D
The Texas Co., Arlda	5,000	5,000
Union Ref. & P. L. Co., Oil City	1,000	S D
Union Ref. & P. L. Co., Homer	1,000	S D
Total for Louisiana	48,650	

MISSOURI

Plant and Location	Capacity	Now running
Wilhoit Ref. Co., Joplin	2,000	1,200
Standard Oil Co., (Indiana) Sugar Creek	12,000	6,850

OKLAHOMA

Acme Ref. & P. L. Co., Jennings	2,600	S D
Allied Ref. Co., Okmulgee	2,000	850
Associated P. & R. Co., Yale	1,000	S D
Barnsdall Ref. Co., Barnsdall	3,000	3,500
Bay State Ref. Co., Healdton	1,000	S D
Beaver P. & R. Co., Dilworth	700	S D
Big Six Ref. Co., Sapulpa	3,000	S D
Bison Ref. Co., Quay	1,000	S D
Blue Ribbon Ref. Co., Walters	500	S D
Bolene Ref. Co., Enid	3,600	3,450
Bristow Gaso. & Sup. Co. Bristow	1,200	1,100
Buffalo Ref. Co., Yale	1,000	S D
Cushing Ref. Co., Cushing	1,000	S D
Cameron Ref. Co., Ardmore	3,500	2,750
Canfield Ref. Co., Yale	500	50
Carter Oil Co., Cartoco	12,000	S D
Champlin Ref. Co., Enid	15,000	2,70
Chestnut & Smith Corp., Sand Sgs.	500	S D
Chas. F. Noble O. & G. Co., Oklahoma City	2,000	S D
Coleman-Nelson Corp., West Tulsa	2,000	800
Coleman-Nelson Corp., Haskell	1,000	S D
Constantin Ref. Co., Devol	10,000	S D
Constantin Ref. Co., West Tulsa	4,500	S D
Cosden & Co., West Tulsa	35,000	23,500
Cushing Ref. & Gaso. Co., Blackwell	12,500	400
Cushing R. & G. Co., Cushing	2,500	1,500
Anderson & Prichard Corp., Okla. City	800	900
Daisy Bell Pet. Co., Wilson	2,000	S D
Damascus Ref. Co., Lawton	1,500	S D
El Dorado Ref. Co., Yale	700	S D
Equality Ref. Co., Oilton	1,000	S D
Empire Refs. Inc., Cushing	5,000	3,500
Empire Refs. Inc., Okmulgee	2,500	2,300
Empire Refs. Inc., Okla City	2,500	S D
Empire Refs. Inc., Ponca City	4,500	3,600
Francis Ref. Co., Francis	5,000	S D
Frederick Ref. Co., Frederick	5,000	S D
Fairmont Ref. Co., Fairmont	2,500	S D
Federal Oil & Ref. Co., Cushing	1,500	S D
Globe Oil & Ref. Co., Blackwell	4,000	1,300
Gilmer Oil Co., Ringling	800	S D
Golden Belt Ref. Co., Okla. City	200	S D
Grandfield O. & R. Co., Grandfield	3,000	1,600
Hewitt Ref. Co., Hewitt	1,600	1,500
Home Oil & Ref. Co., Yale	2,000	S D
Indian Chief Ref. Co., Cushing	1,800	S D
Loraine Pet. Co., Bristow	2,500	2,300
Imperial Ref. Co., Ardmore	6,000	6,100
Indiahoma Ref. Co., Okmulgee	9,000	S D
Illinois Oil Co., Cushing	3,000	600
Inland Ref. Co., Cushing	3,000	S D
Johnson Oil Ref. Co., Cleveland	2,500	2,850
Lawton Ref. Co., Lawton	1,100	S D
Local Refining Co., Okla. City	1,000	650
Marland Ref. Co., Ponca City	12,000	7,200
Marland Ref. Co., Covington (Peppers)	1,000	300
Maud Oil & Ref. Co., Maud	400	S D
Mecca Ref. Co., Allen	1,600	S D
Meridian Ref. Co., Okmulgee	3,000	S D
Meridian Ref. Co., Hominy	1,000	S D
Meridian Ref. Co., Ponca City	2,500	S D
Mid-Co. Pet. Co., West Tulsa	7,000	S D
Navajo Ref. Co., Sapulpa	1,500	800
North American Ref. Co., Pemeta	1,500	S D
Nyanza Ref. Co., Wilson	3,500	800
Oil State Ref. Co., Enid	2,500	500
Pontotoc P. L. & Ref. Co., Allen	1,500	S D
Omar Ref. Co., Garber	2,500	1,450
Oklahoma P. & R. Co., Muskogee	2,500	S D
Pawhuska Ref. Co., Pawhuska	1,000	S D
Waite Phillips Co., Okmulgee	4,000	4,050
Pierce Oil Corp., Sand Springs	9,000	4,750
P. & R. Corp., Blackwell	2,500	1,050
P. & R. Corp., West Tulsa	6,000	4,000
Pure Oil Co., Ardmore	7,000	3,600
Pure Oil Co., Cushing	6,500	6,000
Pauline Ref. Co., Hampton	1,200	500
Powerine Oil Co., Billings	500	S D
Pioneer Pet. Co., Guthrie	2,500	S D
Sheridan Ref. Co., Newkirk	2,000	S D
Rock Island Ref. & P. L. Co., Duncan	1,200	1,400
Santa Fe O. & R. Co., Ardmore	5,000	S D
Shaffer O. & R. Co., Cushing	6,500	6,000
Sapulpa Ref. Co., Sapulpa	7,000	S D
Southern Oil Corp., Yale	6,000	S D
Southern Oil Corp., Walters	2,500	S D
Sun Co., Yale	4,500	2,050
Southwestern Oil Corp., Enid	1,800	S D
Sinclair Ref. Co., Cushing	5,500	7,500
Sinclair Ref. Co., Muskogee	2,000	800
Sagimore Oil Corp., Grandfield	2,000	1,800
Texas Co., West Tulsa	8,000	7,600

Established 1867

The Vilter Manufacturing Co.

1152-1162 CLINTON ST., MILWAUKEE, WIS.

Vilter High Speed Horizontal Refrigerating Machine

Builders of Refrigerating Machinery, Oil Cooling Coils, Gasoline Condensers, Etc.

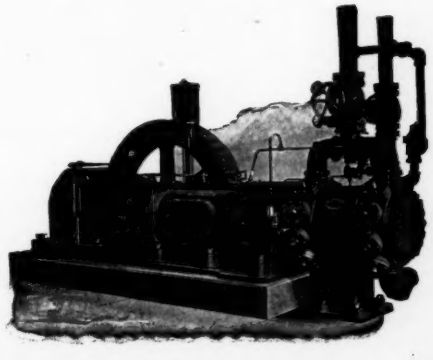
Vilter Equipment is used in many of the oil refineries.

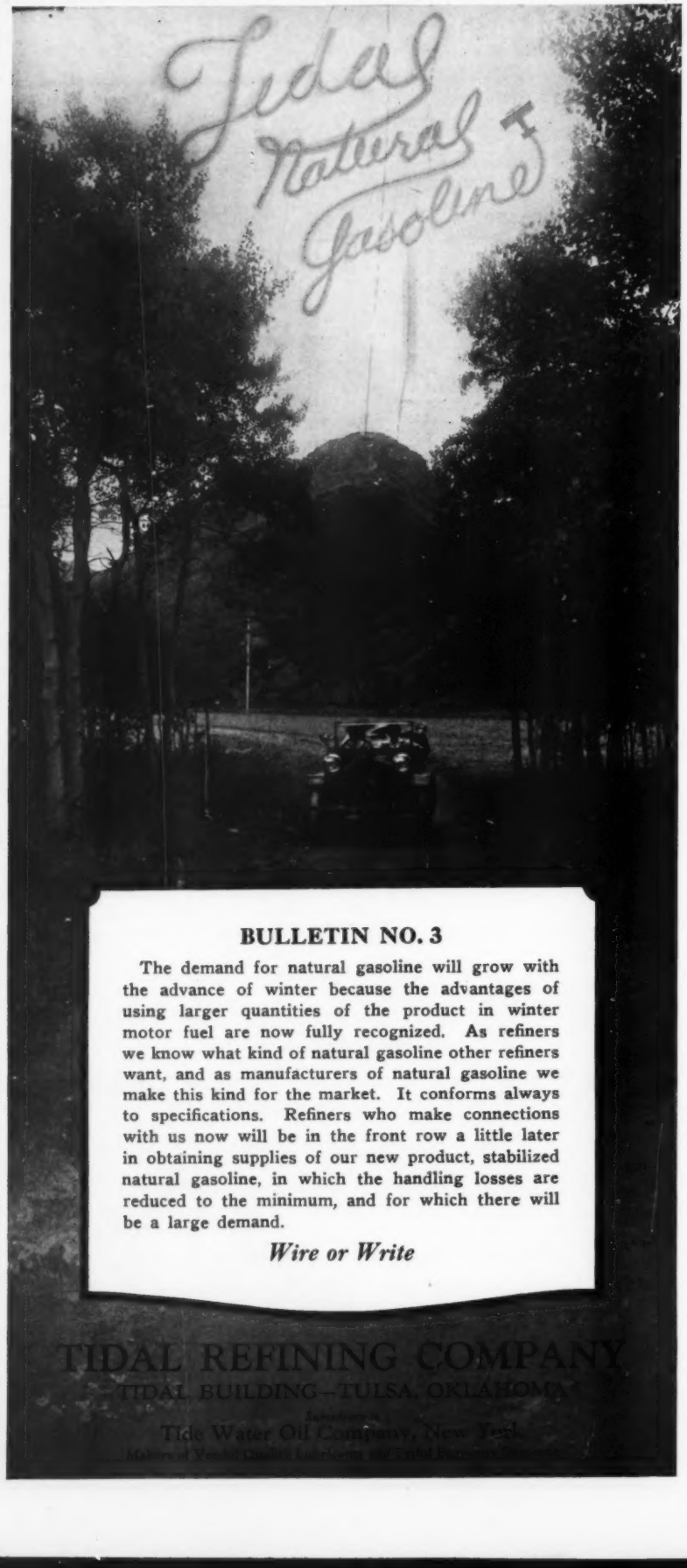
Vilter-Milwaukee typifies the true standard of reliability in machinery construction and refrigerating engineering.

Vilter Low Temperature Compression System (for efficiently producing low temperatures with compression system.)

Vilter Sales Engineers always at your service.

Branch offices in all the principal cities.





BULLETIN NO. 3

The demand for natural gasoline will grow with the advance of winter because the advantages of using larger quantities of the product in winter motor fuel are now fully recognized. As refiners we know what kind of natural gasoline other refiners want, and as manufacturers of natural gasoline we make this kind for the market. It conforms always to specifications. Refiners who make connections with us now will be in the front row a little later in obtaining supplies of our new product, stabilized natural gasoline, in which the handling losses are reduced to the minimum, and for which there will be a large demand.

Wire or Write

TIDAL REFINING COMPANY
TIDAL BUILDING—TULSA, OKLAHOMA

Subsidiary of
Tide Water Oil Company, New York

Plant and Location	Capacity	Now running
Tide Ref. Co., Drumwright	4,500	3,400
Texas Pacific Coal & Oil Co., Wynnewood	1,500	2,100
Travis Senter Ref. Co., Comanche	1,500	900
Tonkawa Pet. Co., Tonkawa	1,500	300
Grandfield Oil & Ref. Co., Grandfield	2,500	S D
Transcontinental Oil Co., Boynton	2,500	1,500
Transcontinental Oil Co., Bristow	5,000	4,600
Turley Ref. Co., Okla. City	2,500	S D
Union Oil Co., Grandfield	2,000	S D
Wagoner Ref. Co., Wagoner	500	S D
Wilcox Ref. Co., Bristow	500	500
Yale Oil Corp., Yale	1,200	950
Oklahoma total	353,900	

TEXAS

American Oil Corp, Pioneer	2,500	400
American Ref. Co., Wichita Falls	5,000	5,000
Associated P.&R. Co., Bridgeport	1,000	300
H. E. Boner, Burkburnett	700	200
The Pet. Corp., Electra	2,000	S D
Buffalo Ref. Co., Sherman	500	200
Burk-Texas Ref. Co., Burkburnett	1,200	S D
Bear Ref. Co., Burkburnett	1,200	S D
Clayton Oil & Ref. Co., Dallas	3,500	2,100
H. H. Cross Ref. Co., Corsicana	2,000	900
Crystal Pet. Co., Burkburnett	1,000	S D
Eastland-Pioneer Oil & Ref. Co., Cisco	1,000	S D
Empire Refs. Inc., Gainsville	7,000	4,200
General Refs. Inc., Abilene	1,500	S D
Gulf Ref. Co., Ft. Worth	15,000	5,900
Gorman Ref. Co., Gorman	1,000	S D
Griswold Ref. Co., Electra	2,000	1,500
Humble O. & R. Co., Burkburnett	1,500	1,100
Humble O. & R. Co., Corsicana	6,500	6,000
Invincible Oil Corp., Ft. Worth.	5,000	S D
Interstate Gaso. Co., Iowa Park	2,000	600
Iowa Park Prod. & Ref. Co., Iowa Park	1,000	S D
Keystone Ranger Ref. Co., Wichita Falls	2,000	S D
Lone Star Ref. Co., Wichita Falls	4,000	S D
Manhattan Pet. Prod. Co., Wichita Falls	2,500	S D
Megargel Oil & Ref. Co., Megargel	500	S D
Miller Pet. Co., Wichita Falls	2,500	1,800
Mexia Oil & Ref. Co., Mexia	600	200
Magnolia Pet. Co., Ft. Worth	12,500	5,800
Noble Oil & Gas Co., Burkburnett	2,000	2,600
Nortex Ref. Co., Burkburnett	2,000	S D
North Texas Ref. Co.,Greenville	1,000	S D
Owenwood Oil Corp., Burkburnett	2,000	S D
Oriental Ref. Co., Dallas	5,000	600
Oddessa Ref. Co., Ranger	1,000	S D
Orient Pet. Co., Wichita Falls	2,000	350
Pierce Oil Corp., Fort Worth	10,000	S D
Panhandle Ref. Co., Wichita Falls	4,500	2,500
Associated P. & R. Corp., Ft. Worth	2,000	S D
Primrose Ref. Co., Wichita Falls	1,500	300
Interstate Ref. Inc., Ranger	2,500	S D
Haggeman Ref. Co., Tiffin	2,000	400
Star Ref. Co., Ft. Worth	1,500	175
State Ref. Co., Dallas	1,000	S D
Sunshine State Ref. Co., Wichita Falls	2,500	1,400
Tidal Western Ref. Co., Burkburnett	3,000	1,600
Texas Co., Dallas	15,000	7,300
Texas Products Ref. Co., Waxahachie	2,000	S D
Texhoma Oil & Ref. Co., Wichita Falls	4,500	2,600
The Petroleum Corp., Electra	2,000	1,000
Tiger O. & R. Co., Breckenridge	1,500	200
Transcontinental Oil Co., Ft. Worth	5,000	1,300
Travis Ref. Co., Burkburnett	1,000	300
Great Texas Ref. Co., De Leon	700	S D
Uniform Pet. Co., Burkburnett	4,000	S D
Virginia Ref. Co., Dublin	4,000	S D
Victor Ref. Co., Burkburnett	2,000	S D
Wagoner Ref. Co., Electra	2,200	2,500
Walker Cons. Ref. Co., Iowa Park	2,500	S D
White Eagle Oil & Ref. Co., Ft. Worth	5,000	3,500
Waco Refining Co., Waco	5,000	S D
Wortham Ref. Co., Wortham	400	S D
World Ref. Co., Bridgeport	800	S D
Texas Total	178,200	

RECENT REFINERY PATENTS ISSUED

BY STAFF REPRESENTATIVE

Washington, D. C.—The following patents of interest to the oil refining industry have recently been issued by the United States Patent Office at Washington:

No. 1,476,091, issued on December 4 to Almer M. McAfee, assignor to Gulf Refining Company, Pittsburgh, Pa., a corporation of Texas. The patent covers a process of and apparatus for the manufacture of lower-boiling hydrocarbons from higher-boiling hydrocarbons. It relates to the distillation of oils with aluminum chlorid, the process comprising kneading during the distillation the gummy masses formed from the aluminum chloride and after such masses become too brittle for kneading performing mechanical comminution thereon.

In an apparatus for the conversion of higher boiling oils into lower boiling with the aid of aluminum chlorid the combination of a still, stirring and lifting means therein and a plurality of steel balls adapted to be lifted by the lifting elements.

No. 1,477,103, issued on December 11 to William Brink, Henryetta, Okla., on a method of gasoline recovery. It covers the process of obtaining a gasoline from heavy waste hydrocarbon and natural gas which consists in heating a small portion of the heavy oil to cause the oil to circulate in a close path, delivering natural gas under pressure to said constantly circulating oil and in a direction of flow opposite to that of said heavy oil, returning the small portion of heavy oil to the remainder of the oil, freeing said gas together with vapor from the heated oil, condensing said vapors and returning the vaporized heavy oil to the cycle.

No. 1,477,860, a patent on an oil-converting apparatus for the conversion and transformation of oils, issued on December 18 to Joseph H. Adams, assignor to the Texas Company, Houston, Texas, a Corporation of Texas. The patent relates to an apparatus of the nature disclosed comprising in combination a bulk oil supply tank, a boiler for vaporizing oils, pipe connections between said tank and boiler, a pump in said connections for supplying oil to said boiler, a pre-heater between said pump and boiler, a converter comprising a series of tubular chambers within a furnace chamber adapted to withstand high heat, a hot vapor pump for taking vapors from said boiler and forcing them into said converter, a carbon and liquid trap connected to the discharge end of said converter, a condenser connected to the vapor space of said carbon and liquid trap, means for collecting and controlling the discharge of liquid and gases from said condenser, means for subjecting the vapors in said converter to a converting or cranking temperature, and means for maintaining vapor pressures in said converter through the condenser.

No. 1,478,102, issued on December 18 to Nathaniel E. Loomis and James R. Carringer, assignors to Standard Development Company, a Corporation of Delaware. It covers the process of treating heavy viscous petroleum oil for breaking down its viscosity which consists in pre-heating the oils to a temperature of 400 to 500 degrees F., forcing the preheated oil through a heated coil whereby the oil is heated to a temperature above 700 degrees F. and cooling the oil before a substantial quantity of low-boiling-point hydrocarbons have been formed therein, a pressure being maintained upon the oil through sufficient to hold it substantially entirely in the liquid phase.

No. 1,478,413, issued on December 25 to Frank E. Wellman, assignor to the Kansas City Gasoline Company, Kansas City, Kans., a corporation of Kansas. The patent relates to an apparatus for and method of cracking hydrocarbons comrising tubes and settling tubes connected in a continuous coil or series, said cracking tubes being exposed to cracking temperature, and being of smaller diameter and capacity than the settling tubes, means for producing a circulation of hydrocarbons to be cracked rapidly through the cracking tubes, slowly from them through the larger

WIRE AKIN

for

CASINGHEAD and ABSORPTION GASOLINE

Swift Shipments from

OKLAHOMA

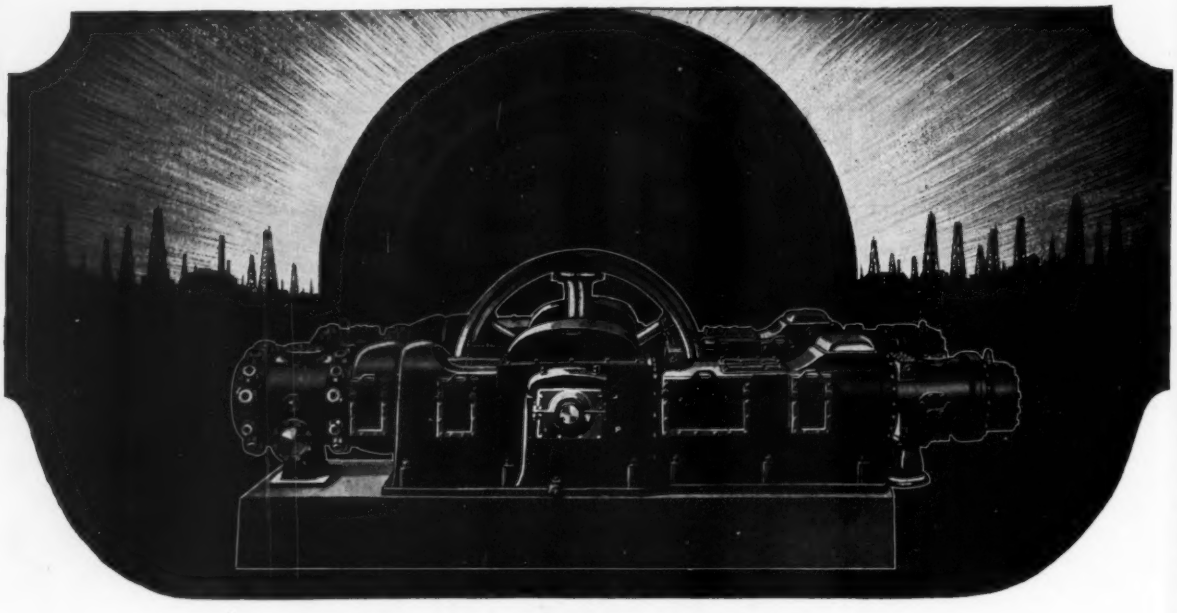
TEXAS LOUISIANA

We make and market all grades of natural gasoline. You can get what you want, right on the dot, when you entrust your order to Akin.

THE AKIN GASOLINE CO.

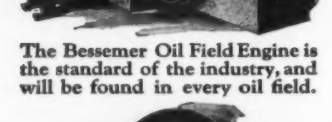
Exchange National Bank Building

TULSA :—: :—: OKLAHOMA



Type Ten Bessemer Direct Gas Engine Driven Compressor

The Bessemer Oil Field Engine is the standard of the industry, and will be found in every oil field.



Bessemer Type VIIIB Compressor with engine and compressor in one unit. Standard equipment in the Gasoline-from-Gas Industry.

Industrial and Oil Field service prove the Bessemer Type IV Oil Engine most efficient and economical where gas is not available.

Mere Technical Excellence Is Not Enough

Oil field service is not theoretical—it is a problem of making good under conditions which are not ideal.

An engine that would operate beautifully in a laboratory under expert supervision might easily fail utterly in the field. Not every oil field engineer has the time to make himself into a Professor of Internal Combustion. An oil field engine must be P-R-A-C-T-I-C-A-L.

THE BESSEMER GAS ENGINE COMPANY
18 York Street ∴ ∴ Grove City, Pa.

BESSEMER

BESSEMER OIL FIELD ENGINES – COMPRESSORS VACUUM PUMPS – ROLLER PUMPING POWERS

Tell them where you saw the ad

REFINERY AND GASOLINE PLANT ACTIVITIES

Invincible Oil Building Plant to Use Special Process to Handle Bellevue Crude

Shreveport, La., Jan. 2.—The Invincible Oil Company, a subsidiary of the Invincible Oil Corporation and, as such, an associate of the well-known Louisiana Oil Refining Corporation, has begun construction on the second unit of what one day doubtless will be a very complete and extensive refining plant across Red River from Shreveport. This company owns a refinery and tank site of approximately 225 acres of land, located at the L. R. & N. and V. S. & P., and near the L. & A. and Cotton Belt railroads, in the outskirts of Bossier City, a municipality separate and apart from the city of Shreveport but economically an integral part thereof.

Officers of the Invincible companies are naturally somewhat reticent in discussing the extent and scope of their plans for the future; but a survey of the situation as apparent to an outsider, including consideration of the size of the site, storage and pipe line conditions, construction, and plans, as well as the proximity of the corporation's own production in the Haynesville, Homer, Bellevue, Caddo, El Dorado and Stephens fields, leaves the impression that a rather comprehensive schedule has been drawn. This site, for instance, is located along the route of the corporation's trunk pipe line which extends to all but Stephens of the fields enumerated above and, in addition to the Smackover field, where the corporation is an extensive purchaser of both light and heavy oil.

The first plant of this construction program is represented by an 800 barrel capacity plant, into which the 3,000-barrel topping plant of the Louisiana Petroleum Products Company, purchased several months ago at receiver's sale by the Invincible Oil Company, has been converted. This reconstructed plant, which has now been in operation about two months, is running on crude produced from the Louisiana Oil Refining Corporation's fee properties in the Bellevue Shallow Field, in Bossier Parish, to which the plant is connected by a pipe line of approximately 20 miles in length.

A secial vacuum process is being used, which was developed in the research laboratories of the organization for the treatment of Bellevue crude, said to be ideal for the manufacture of lubricating oils, by reason of its high flash and fire and low cold tests, representing, as it does, a happy medium between asphalt and paraffin base oils. This crude is of the same general character as the famous Humble, Goose Creek and West Columbia crudes of the Gulf Coast, highly valued in the manufacture of lubricating oils. The newly developed process produces straight-run homogeneous lubricating oils of the highest viscosity and lowest cold test, which meet the strictest requirements for the lubrication of internal combustion engines, in that they do not break down at high temperatures and do not leave carbon deposits as do compounded oils.

The second item on this program of expansion is a cracking plant of an ultimate capacity of 4,000 barrels or more per day. It is to be composed of four units, of equal capacity, to require an expenditure of about a half million dollars. It is said that two units are to be built at once, to be in operation within three or four months, the remaining two to be constructed at a later date. Foundations have been completed and brick work begun on the first unit; and ground is now being broken for the second. Construction is in the hands of the Leonard Construction Company, of Chicago.

The Carlton-Ellis Tube and Tank Process is being installed. This process operates at a 350-pound liquid (pump) pressure. There are two soaking drums in each unit which weigh 96,000 pounds each. An acid restoring plant and a continuous treating plant for distillates also are to be built.

A six-inch line has been laid from the Bossier City site to the Louisiana Oil Refining Corporation's 10,000-barrel

---

settling tubes and then again through the cracking tubes, said tubes being arranged to form a constant downward channel for the hydrocarbon from the entrance to the cracking tubes to the discharge point of the settling tubes, and means for blowing out said settling tubes between operations.

The method of cracking hydrocarbons consists in maintaining rapid circulation of the same through a constricted area heated to cracking temperature, then causing the same to expand into a less constricted area for settling purposes, then picking up the material from which the carbon has settled out and returning it to the constricted cracking area, taking off cracked products from the constricted area and finally when the required percentage of conversion is attained blowing out the contents of the settling area.

N. 1,478,444, issued on December 25 to Almer McDuffie McAffee, assignor to Gulf Refining Company, Pittsburgh, Pa., a corporation of Texas. The patent relates to the conversion of oils into products of lowered boiling point, the process comprising distilling a high boiling oil with anhydrous aluminum chloride at a pressure greater than atmospheric.

No. 1,478,559, issued on December 25 to Gustav Egloff, New York, N. Y., on a process of treating hydrocarbons to convert heavy into lighter hydrocarbons consisting in externally heating the oil maintained in a substantial body to a distilling temperature, continuing the conversion by internally heating the oil body by an electrical resistance unit, confining a percentage of the generated vapors above the oil body for maintaining a regulated vapor pressure in excess of twenty pounds to the square inch upon the oil during treatment.

Showing the arrangement of the auxiliary steam pumps recently installed in the Baltic Gasoline Company's new natural gasoline plant in Stephens County. Five of these standby pumps have been placed in this plant, although only four are shown in the picture.

toppIng plant at Gas Center, in the western outskirts of the city of Shreveport. This fact strongly corroborates the writer's impression that the first operation of the new cracking plant will be devoted to the cracking of gas oil, fuel oil, and distillates from the Gas Center topping plant. The additional fact that expansion of the Gas Center plant is not considered feasible, for several reasons, is sufficient to cause one to believe that a new and greater topping plant may, in the course of time, be built at Bossier City, as a complement to the plants already there or to be constructed there, with the ultimate result that all of the Invincible's activities may be centralized there.

Auxiliary Steam Pumps Being Installed In Many New Natural Gasoline Plants

Breckenridge, Texas. — Auxiliary steam pumps are being installed in most of the new natural gasoline plants being erected in the Central West Texas district to avoid shut downs in the event trouble develops from the gas engines of centrifugal pumps. The extra cost of installing these standby, or steam pumps is often repaid during the first few months of the operation of a plant by reason of their initial cost being comparatively low and preventing loss of production by breakdowns.

The Baltic Gasoline Company of Ranger, Texas, has installed five of these standby pumps in its natural gasoline plant completed early last month near Frankell in Stephens County. This plant is equipped to handle about seven million cubic feet of gas daily, and is one of the most modernly equipped plants in the state, having cost approximately $250,000.

Transcontinental Near Complete on Lube Plant

Fort Worth, Texas.—The Transcontinental Oil Company has completed the lubricating oil and wax plant unit to be operated in conjunction with its refinery here, and started operating the new equipment shortly after the first of January. This new addition to the refinery represents an investment of approximately $1,000,000, and construction was started about two years ago, but was halted in 1923 for a number of months owing to conditions in the refined market. A cracking unit was only recently placed in operation at this plant. In anticipation of the operation of the lube and wax units, the Transcontinental Oil Company has preserved during the past year a large volume of the residuum and tops from Ranger crude, which is in demand for light cylinder stocks. It is also preparing to erect a loading rack in Reagan County's new oil field to purchase oil from the Big Lake Company an allied concern, because of the excellent paraffin base of this crude, along with a good gasoline content.

Chestnut and Smith Corp. Adding to Texas Plant

Ranger, Texas.—Approximately 15,000 gallons of natural gasoline production is expected to be added to the present daily output of Chestnut & Smith Corporation's plant No. 108 in the Ranger field as result of new equipment now being installed at this plant at an estimated cost of $200,000. The engine room of this plant was damaged by fire and an explosion last October, but it was out of commission only a short while.

The new equipment being added will provide for handling about 20,000,000 cubic feet of gas daily under rock pressure, and when completed will make this plant the largest in Eastland County.

Los Angeles, Calif.—An insurance policy for $1,000,000 has been issued to Richard Florian, president of the Western Refining Company, payable to the company. This is one of the largest policies ever issued on the West Coast and Mr. Florian's friends say that it is proper that it should be for an oil man.

Los Angeles, Calif.—The Petroleum Export Corporation is laying a twelve inch pipe line to Los Angeles Harbor to connect with the company's wharf and loading station. It is expected this company's building program will have been completed by February 1.

PIONEER TANK & BOILER COMPANY

A New Name for an Old Friend

WHAT'S in a name, anyway? The refinery construction work we are doing under the name "Pioneer" is just the same high grade as when it bore the name "Tulsa Boiler and Sheet Iron."

For eighteen years, as the "Tulsa Boiler and Sheet Iron Works" we have turned out tanks and refinery steel construction that made good friends for us among the wise buyers of the Mid-Continent. We pioneered in giving these people "close to home" service on the best kind of work.

Now, under the new name, The Pioneer Tank and Boiler Company, we're all set with the men, machinery and money to keep on growing under the Pioneer banner like we did when Tulsa Boiler and Sheet Iron was on our letterhead.

There is no change in our organization.

Get Pioneer quotations on tank and refinery construction work.

PIONEER TANK & BOILER COMPANY
(Formerly Tulsa Boiler and Sheet Iron Works)
Box 1926, TULSA, OKLA.

READY FOR SAFE SHIPMENT?

Use our dome covers and outlet caps, and be SURE. They are conscientiously made and priced reasonably. Orders by wire or letter handled promptly. We are especially equipped to provide Brake Shoes, Gray Iron Castings, Plate Work, Beams, Sheet and Structural Steel.

Oil Well Rig Irons and Refinery Equipment

Western Iron & Foundry Co.
Wichita, Kansas

natural gasoline

grade "a"

GRAVITY.....Not below 72° Be.
Not above 78° Be.
E. P.....Not over 375° F.
RECOVERY.....Not less than 90%

grade "b"

GRAVITY.....Not below 76° Be.
Not above 82° Be.
E. P.....Not over 375° F.
RECOVERY.....Not less than 85%

grade "c"

GRAVITY.....Not below 80° Be.
Not above 88° Be.
E. P.....Not above 350° F.
RECOVERY.....Not less than 78%

grade "d"

GRAVITY.....Not below 88° Be.
Not above 92° Be.
E. P.....Not above 350° F.

THE most active and powerful thing in the universe is the infinitesimal particle called the "electron." It is the source of all action and power. The NATURAL GASOLINE constituent of motor fuel is strikingly akin thereto.

If you want power, action, economy and a quick start in your motor on a cold winter's morning add plenty of NATURAL GASOLINE to your motor fuel.

Chestnut & Smith Corporation have large manufacturing, storing and shipping facilities, and can supply your NATURAL GASOLINE requirements promptly in carload or trainload lots at 'most any time.

We shall appreciate the opportunity of quoting you. Be sure and get in touch with us at all times before buying NATURAL GASOLINE.

C&S CORPORATION

grade "1"

GRAVITY.....Not below 58° Be.
Not above 62° Be.
E. P.....Not over 437° F.
RECOVERY.....Not less than 91%

grade "2"

GRAVITY.....Not below 58° Be.
Not above 62° Be.
E. P.....Not over 450° F.
RECOVERY.....Not less than 90%

grade "3"

GRAVITY.....Not below 64° Be.
Not above 66° Be.
E. P.....Not over 440° F.
RECOVERY.....Not less than 88%

grade "4"

GRAVITY.....Not under 66° Be.
Not over 70° Be.
E. P.....Not over 435° F.
RECOVERY.....Not less than 82%

CHESTNUT & SMITH CORPORATION

GENERAL OFFICES - CHESTNUT SMITH BLDG. - TULSA OKLA.

Tell them where you saw the ad

Sweetwater Refinery Is Being Enlarged

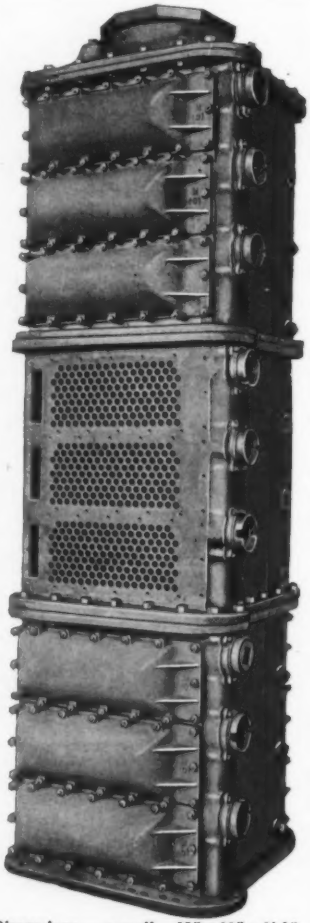
Sweetwater, Texas.—Materials have been ordered to increase the daily capacity of the Owens Oil and Refining Company's refinery here from 700 to 1,200 barrels following its recent purchase from R. L. Ray of Fort Worth. This plant was erected several years ago by the Rex Oil & Refining Company, and has recently been operating under the name of the Sweetwater Refining Company, with J. M. Shade in charge.

The new owners have headquarters at Jamestown, N. Y., and are negotiating for a string of filling stations in the East, while it is planned to erect several stations in Sweetwater. The plant is now operating part capacity on crude from the Electra field, and arrangements are being made to obtain crude via tank cars from Mitchell and Reagan Counties in West Texas.

The officers of the Owens Oil & Refining Company are: H. H. Owens of Fort Worth, chairman of the board of directors; Joseph Carlson, president; M. J. Bryden, secretary-treasurer; and Paul Roessner, general manager.

Type B-540 Gasoline Condenser
(Patented)

Compact — Efficient — Flexible



Dimensions — overall, 30" x 30" x 9'-0"
(inc. top and bottom bonnets)

SOUTHWESTERN CONDENSER COMPANY
1215-1221 Hollingsworth Bldg.,
Los Angeles, Calif.

Plan New Gasoline Plant For Ibex Pool in Texas

Breckenridge, Texas.—A five million cubic foot daily capacity natural gasoline manufacturing plant will probably be erected by the Dunnigan Tool & Supply Company in the Ibex field in Shackelford County, Texas, within the next two months, according to present plans. It is expected that the plant will cost about $60,000 when completed, and it will make use of the absorption process under natural pressure. Some of the gas will be furnished by Dunnigan & Herman's producing well on the J. J. Witty farm in the Ibex field.

Eastland Gasoline Plant Changes Hands

Eastland, Texas.—The Western Gasoline Corporation has purchased the Benwick Company's recently completed natural gasoline manufacturing plant located near Eastland for a consideration reported at $95,000. This plant is on the J. R. Stubblefield lease, section 3, H. & T. C. Ry. survey, block 3, and is equipped to handle 8,000,000 cubic feet of gas daily, with rock pressure absorption process. It started operating late in December, and is expected to have a daily recovery of approximately 4,000 gallons of gasoline when additional gas already contracted for is connected up. The new owners of this plant have announced that another natural gasoline plant will probably be erected in Central West Texas this coming spring.

The Western Gasoline Corporation maintains headquarters at 501 Mrs. Dan Waggoner building, Fort Worth, Texas, and is to establish a branch office in Kansas City shortly. The officers are: T. L. Clark of Fort Worth, president; C. C. Clark of Tacoma, Washington and Louis Bendit of Kansas City, vice presidents; J. W. Chadwick of Kansas City, secretary and treasurer. The directors include the above officers and B. B. Brain of Kansas City.

F. N. WILLIAMS
PETROLEUM ENGINEER
Specializing in Design, Construction, Operation and Management of Refineries, Investigation and valuation. Reconstruction of refineries to meet modern conditions.
2213 Park St., Beaumont, Texas

Electrically Driven Centrifuges
Hand Centrifuges
WRITE
WILLIAMS, BROWN & EARLE, Inc.
Manufacturers of Laboratory Apparatus
918 Chestnut St. Philadelphia, Pa.

Lone Star Has Largest Gasoline Plant in Texas

Dallas, Texas.—The Lone Star Gas Company, with headquarters in this city, has completed the largest capacity natural gasoline plant in Texas. This plant is located near the town of Gordon in Palo Pinto County section of Central West Texas, and is on the company's 18-inch line that transports gas from Central West Texas oil and gas fields to scores of cities and towns in North-Central Texas. It is equipped to handle 65,000,000 cubic feet of gas daily, and represents an investment of approximately $250,000. The construction work on this lant was started July 10, and it was in operation Novemebr 15, thereby establishing a record for fast construction work for a plant of its size.

This plant is credited with having produced more than 30,000 gallons of natural gasoline daily on its initial runs. In conjunction with this plant the Lone Star Gas Company has erected four compressor stations in the Ranger, Eastland and Desdemona field, having a total of 30 engines, and approximately 54 miles of 12, 16 and 18-inch lines were built. All of this construction work was started in July, and represents a total expenditure of approximately $3,000,000.

Gilmore Refineries Are Being Doubled

Los Angeles, Calif.—The capacities of the Gilmore Oil Company refineries at Vernon and Salt Lake are being about doubled, work to this end now being in progress at both plants.

The company had a refining capacity of 5,000 barrels a day and this is being increased to 10,000 barrels.

The company has production at the Salt Lake field and also at Torrance where it recently completed three wells. The company also secures production from a few other independently owned producers.

Static Electricity Causes Vernon Fire

Los Angeles, Calif.—Fire damage to the extent of about $35,000 occurred early in December at the Vernon plant of the White Star Oil & Refining Company. It is thought the fire started from static electricity.

Quick work on the part of the fire department prevented spread of the fire to other industrial concerns in that section.

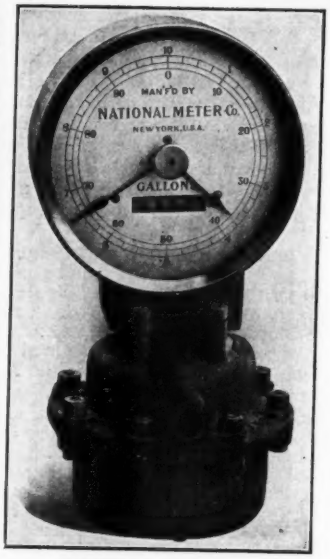
Ichthyol Plant to Be Built by McAdoo

Los Angeles, Calif.—The McAdoo interests in conjunction with Tom Hanna are arranging for the erection of a small refinery at Devil's Den in Kern County for the extraction of ichthyol.

The crude at Devil's Den is said to have a high content of ichthyol, in demand for its medical properties.

Kansas City, Mo.—The Kansas Refining Company with a plant at Coffeyville, Kansas, is being acquired by the Diamond Refining Company of Kansas City through a merger with the Alluwe Oil Company, owners of the Coffeyville refinery.

EMPIRE OIL METERS



Oscillating Piston Type

Will Measure With Close Accuracy

CRUDE OIL
FUEL OIL
GAS OIL
DISTILLATES
GASOLINE

IN THE REFINERY

Measuring and checking processes can be handled more satisfactorily with EMPIRE oil meters than in any other way. They are easy to install and keep in order, are very durable and **continuously** accurate.

MADE IN ALL SIZES, 5/8" to 6" INCLUSIVE

NATIONAL METER COMPANY

299 BROADWAY, NEW YORK

Chicago, Cincinnati, Boston, Atlanta, San Francisco, Los Angeles, Winnipeg, Can., London, Eng.

Services Available for the Oil and Gas Industry As:

CONSULTING ENGINEERS in all matters pertaining to:

Pipe Line Transportation of Petroleum and Natural Gas
Recovery of Gasoline by Absorption or Compression
Compressing and Booster Plants
Gas Engines and Compressors

CONSTRUCTING ENGINEERS AND CONTRACTORS, specializing in:

Pipe Lines for Gas and Oil
Compressing and Booster Plants
Gasoline Recovery Systems, Absorption and Compression
City and Inter-City Gas Mains

No contract too large to complete with satisfaction and dispatch or too far away to handle.

MANUFACTURERS and DISTRIBUTORS of Gas and Oil Specialties, including:

Heat Exchangers
Gasoline Recovery Equipment
Compressing and Booster Station Equipment
Reeves Vertical Gas Engines and Compressors
Hope Biplane Compressor Valves
Hope River Clamps and Re-inforced Joints

Consulting and Contracting Engineers in Natural Gas and Oil.

HOPE ENGINEERING & SUPPLY CO.
Mt. Vernon, Ohio, U.S.A.

Branches Pittsburgh, Penna. Tulsa, Okla. Casper, Wyo.

LUCEY

"Wherever LUCEY There's Oil"

STEEL CASTINGS FOR REFINERIES

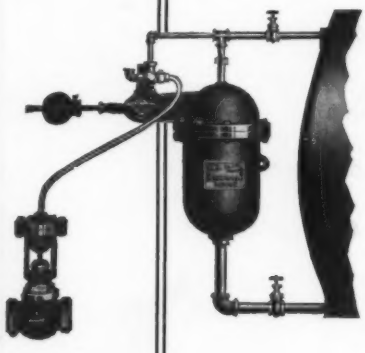
Open Hearth Process
Quick Delivery—Made in Houston
From One Pound to 8000 Pounds
Analysis of Every Heat Controlled in Our Own Laboratories, Insuring Uniform Quality.
Complete Pattern Shop, Machine Shops, Metallurgical and Engineering Staff at Your Disposal.

R. U. CULBERSON, Receiver
LUCEY MANUFACTURING CORPORATION OF TEXAS
Houston, Texas

Beaumont, Texas Shreveport, La. El Dorado, Ark. Mexia, Texas
Smackover, Ark. Corsicana, Texas Dallas, Texas

STEEL

The AUTOMATIC WATCHMAN of ABSORBING TANK and STILL



In the process of the manufacture of gasoline by absorbing the gasoline in oil and subsequently separating the gasoline from the oil by distillation, it is necessary to maintain a constant oil level in both the absorbing tank and the still.

For this purpose the Chaplin Fulton Mfg. Co. of Pittsburgh, Pa., have manufactured

THE VIGILANT OIL LEVEL REGULATOR

which will adapt itself to any type of absorber of steam still, and maintain a constant oil level under all conditions of temperature and pressure.

The VIGILANT OIL LEVEL REGULATOR is mounted on the side of the tank so that the center of the chamber is opposite to the oil level desired.

Full information and prices upon application

Chaplin-Fulton Manufacturing Company
28-36 Penn Ave. Pittsburgh, Pa.

American Pump Buys Out Advance Company

Battle Creek, Mich.—The American Steam Pump Company of Battle Creek, Michigan, has purchased the plant, assets and entire business of the Advance Pump & Compressor Co., of that city, negotiations having been completed on November 21st. At the time of this purchase, the American Steam Pump Company increased their capital stock from $500,000 to $1,000,000, giving their stockholders a stock dividend of 68%, the balance of the increase being used in the purchase of the Advance properties.

The American Steam Pump Company as a corporation has been in business for 50 years, originally being incorporated July 2nd, 1873, under the name of the Battle Creek Machinery Co. The Company has therefore celebrated its Golden Jubilee by taking over the Advance Pump & Compressor Co.

The Advance Pump & Compressor Co. as a corporation has therefore dissolved and all business in the future will be carried on by and under the name of the American Steam Pump Company, and the pumps heretofore known in the field as "Advance" under the American ownership will be known as "American-Marsh."

The officers of the American Steam Pump Company will remain the same as in the past; Richard R. Hicks, president and treasurer, John W. Bailey, Vice-President, Walter R. Munn, Secretary and Traffic Manager, Arthur Greene, Assistant Treasurer, and M. C. Abbey, Supt. The staff includes Edwin H. Davis, M. E., Karl G. Sommer, M. E., C. R. Davis, Advertising and Sales, and C. N. Forsyth, Purchasing Agent.

California Gasoline Yield Shows Increase

Los Angeles, Calif.—Casinghead gasoline plants in Southern California during October produced a total of 15,890,147 gallons of natural gasoline, against 14,648,928 gallons in September. These figures were compiled by Victor C. Killick, statistician for the Independent Petroleum Marketers Association, headquarters at Los Angeles.

It is thought that the production in November and also for December will show decreases, since the output of gas at the big fields in Southern California is showing a steady decline.

For several months the production of Natural gasoline in California exceeded all demands and for that reason "distress" natural gasoline broke the market. Some of the production was stored, considerable was run into crude pipe lines mixing with the crude and a large part was used for blending purposes.

Los Angeles, Calif.—A statement was made in December that work would start soon after the first of the year erecting a refining plant for the district of Los Angeles. A complete plant was purchased in Texas and is to be moved to Los Angeles.

The refiner who is not equipped to crack every type of oil, whether fuel, topped oil, gas oil or low grade crude, direct and without pre-distillation or pre-treatment, has an awful handicap against those who have the Dubbs Cracking Process

And the refiner who does not crack his oil is likely to crack his Company if he does not completely break it

Universal Oil Products Company
Owners of the Dubbs Process
208 South La Salle Street Chicago

÷ REFINERY SUPPLIES ÷

Refiners' Supplies

	Dec. 15
Soda Ash light 58% ..... cwt.	$1.38–1.50
Silicate of Sola 60 deg. bbls..... cwt.	1.70
Sal Soda wks ..... cwt.	1.10–1.30
Caustic Soda 76% ..... cwt.	1.10–3.17
Chloride of Lime solid..... cwt	... 1.25
Sulphuric Acid 60 deg. tank cars f. o. b. shipping point....per ton	11.00
Benzol—	
Pure Water White .....Tanks....gal	.23 —.28
Drum...gal.	.28 —.33
90% . .....Tanks...gal	.21 —.26
Drums...gal	.26 —.31

Jobbers' Supplies

Vegetable Oils—	
*Linseed, carloads Spot.....gal.	—.92
January . .....gal.	—.92
Less carload Spot .....gal.	—.95
5 bbls. or less Spot.....gal.	.98–.97
Boiled, tank Spot .....gal.	—.88
Boiled, carloads Spot .....gal.	—.94
Soya Bean Spot, Tanks.....lb.	—.10½
Animal Oils—	
English Degras . .....lb.	$–.04¾
Domestic Degras, bbls., carloads....lb.	–.03¾
Horse . .....lb.	.07½–.08
Oleic Acids—	
Dist . .....lb.	.07¾–.08½
Saponified . .....lb.	.07¾–.08½

Lard Oils—	
Prime	
Winter	
Strained.....2 to 4½ ffa. 40/45c. t. lb.	13¼
Extra	
Winter	
Strained.... 2 to 4½ ffa. 40/45c. t. lb.	13½
Extra.....4 to 5 ffa. 40/45c. t. lb.	12¼
Extra No. 1....7 to 10 ffa. 40/50c. t. lb.	10¾
Extra No. 1....15 to 18 ffa. 40/50c. t. lb.	10¼
No. 2.....22 to 23 ffa. 40/45c. t. lb.	.09¾
Prime Edible Tallow under 1⅜ ffa. 40/45c. t. N. Y. .....lb.	.09 –.09¼
Tallow acidless . .....lb.	11½
Lard Stearine .....lb.	.15½
Oleo Stearne .....lb.	10¾–11
Neatsfoot Oil—	
Pure . .....bbls.-lb.	.14¼
Extra . .....bbls.-lb.	.10¾
No. 1 .....bbls.-lb.	.10¼
Cold pressed .....lb.	.17½
Fish Oils—	
Menhaden Oil	
Light pressed . .....gal.	$ –.65
White . . ..gal.	–.70
Yellow bleached . .....gal.	–.68
*Herring, tankcars coast .....gal.	–.40
Whale, extra winter bleached ....gal.	–.81
Seal	Nominal
Naval Stores—	
Turpentine, N. Y. .....gal.	.92½
†Turpentine . .....gal.	–.85¾
Rosin B. N. Y. .....Bbl.	5.70
Rosin F. N. Y. .....Bbl.	5.70
Rosin B.† .....Bbl	4.27½
Rosin F.† .....Bbl.	4.27½
Rosin Oil 1st run .....gal.	.43
Rosin Oil 2nd run . .....gal.	.46
Pine Tar—	
Kiln Burnt . .....Bbl.	11.00
Retort . .....Bbl.	11.00

*Nominal
†Savannah, Ga., market.

Gasoline Plants Are Building New Storage

Breckenridge, Texas.—Considerable steel storage, with water top roofs and other evaporation loss reducers, is being erected by natural gasoline plants in the Central West Texas district to store their production for more favorable market conditions. Many of the companies that launched their storage building programs towards the close of 1923 and filled all available space, have since paid for the cost of the tankage by increased value of the natural gasoline held off the market until prices took heir upward swing late in December. The Chestnut & Smith Corporation is adding a number of tanks, while the Landreth Gasoline Company is erecting two 10,000 barrel capacity tanks, in addition to 28 24,000 gallon capacity tanks already in service.

THE FOSTER BAFFLE

For
Absorption
Towers

Vent Towers

Steam Stills

Dephlegmating
Towers

Expansion
Towers

93% Open Space

125 Square Feet of "Flow Surface" per Cubic Foot of Baffle.

Highest Type of Design for "FLOW PHASE" ABSORPTION

Manufactured and For Sale by

DEAN E. FOSTER

Consulting Engineer

SPECIALIZING IN THE DESIGN AND CONSTRUCTION OF NATURAL GASOLINE PLANTS

LYNCH BUILDING TULSA, OKLAHOMA

Roeser & Pendleton's Plant No. 1, Breckinridge, Texas. W. L. Seely, Engineer.
Note space occupied by Sterling Sections and lack of support compared with pipes.

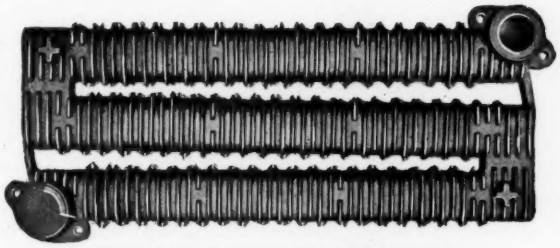
The test installation convinced them

ROESER & PENDLETON made their initial installation of Sterling Oil Condensing Sections (5,000 sq. ft.) in their Absorption Plant No. 1, Breckinridge, Texas.

They were surprised to find how much less space for the same amount of condensing surface is necessary for Sterling Sections than for coils.

When they built their No. 2 Plant they installed 35,000 square feet of Sterling Sections and were able to build the spray pit 40% smaller than would have been required for the same amount of coils.

In addition to economizing on space, making possible smaller boxes than for coils, thus cutting the cost of construction, Sterling Sections are cheaper to install—require less support—reduce Receiving House temperature (sometimes as much as 10°)—are easily removed for cleaning, repair or replacement—have longer life than coils. (The cast iron of which they are made resists the rust of the outside water and the corrosion of the acids in the vapors.)



Single Unit of Sterling Condensing Section

The full story of Sterling Sections is contained in a brief eight-page illustrated booklet. Send for a copy to the nearest address below.

Our engineer will be glad to call and tell you how Sterling Sections can be used in your plant.

AMERICAN RADIATOR COMPANY

IDEAL Boilers and AMERICAN Radiators for every heating need

Industrial Sales Offices: 1807 Elmwood Ave., Buffalo, N.Y.

Sterling Condensing Sections are Manufactured in Kansas City, Mo.—Springfield, Ohio—Buffalo, N.Y.

The Weakest Spot in Your Tank
Is the Underside of its Roof

NO—Gentle reader, these are not pictures of the stars or comets, but just show God's good sunlight shining through holes eaten *from the inside,* through the roof of an eight months old 65000 bbl. storage tank.

YES—This was an extreme case where the oil stored was a high sulphur content Mexican Panuco Crude, *but* unseen; the same rusting or eating of the metal to an equal or less degree is taking place on the underside of a vast majority of storage tanks.

WHY—Because sulphur fumes, gases and moisture condense on the underside of the roof and supports and thrive on the bare or improperly painted metal, which, the tank once filled, is hard and expensive to clean and repaint.

STOP it? Sure,—by using a suitable Paint Primer (No. 32L) and

Degraco Products

Tank Paints
Head Liner Enamels
Tank Car Paints
Pipe Line and Station Finishes
Superior Graphite Paint
Sta-White
Degraco Paints for Houses
Degraco-Tone

Degraco No. 16 Head Liner Enamel

No. 16 is an enamel finish interior paint which resists the action of fumes and condensation of even Mexican crudes. It should be used on the underside of the roof and supports of every new (or old where possible) storage tank.

May we send you cost figures and facts?

Detroit Graphite Company
592 Twelfth St., Detroit, U. S. A.

NEW YORK
CHICAGO
TULSA
ST. LOUIS
SAN FRANCISCO
TAMPICO
HOUSTON
KANSAS CITY
PHILADELPHIA
PITTSBURGH
LOS ANGELES

DEGRACO PAINTS are sold through branch offices with warehouse stocks in all principal cities.
Manufactured in Canada by Dominion Paint Works, Ltd., Walkerville, Canada.

DEGRACO PAINTS VARNISHES ENAMELS
All Colors for All Purposes

Name.....
Position.....
Company Name.....
Address.....
State.....
Detroit Graphite Co. Detroit, Mich. 592